

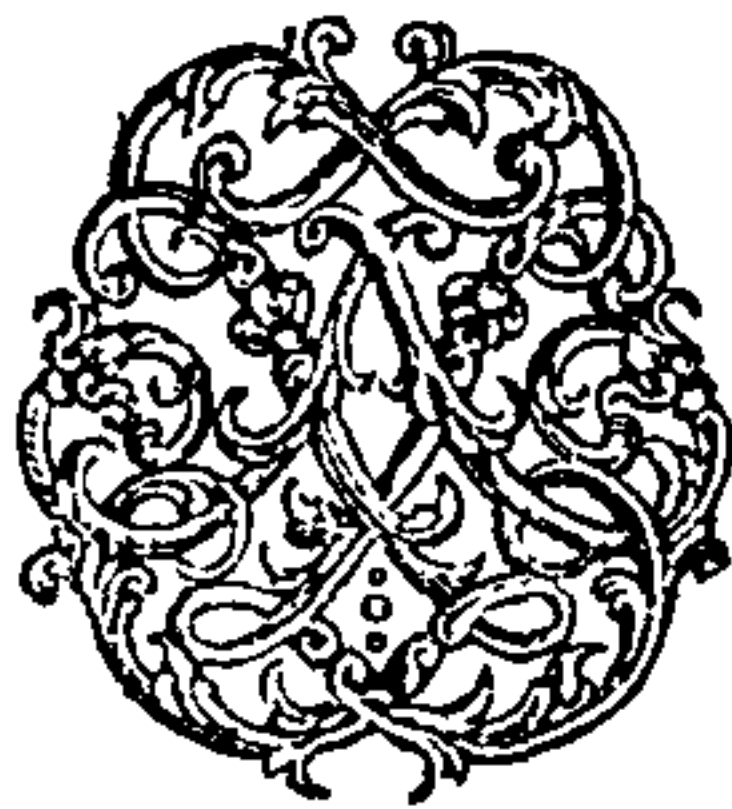
LECTURES
ON THE
MATERIA MEDICA,

AS DELIVERED

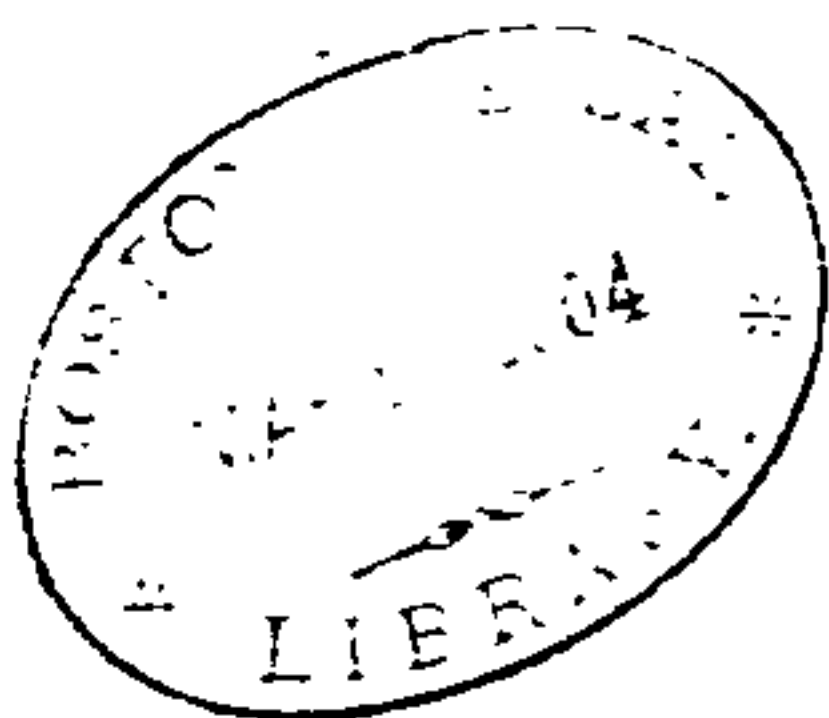
By WILLIAM CULLEN, M.D.

PROFESSOR of MEDICINE in the University of EDINBURGH.

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L O N D O N,
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John Jeffries, M.D.,
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of Boston.

(H. C. 1015-7 1854.)

P R E F A C E.

THE following Sheets are offered to the World as containing the substance of a Course of Lectures on the Materia Medica, delivered by a celebrated Professor at Edinburgh. As they are not alledged to be printed by his direction, it may seem necessary to lay before the Public the reasons which induced the Editors to this step, as nothing can be farther from their thoughts than the least intention of injuring either the fame or interest of that Gentleman, for whose mind and abilities they have the highest admiration and esteem. This is so far the case, that they would think themselves extremely happy, if, on a sight of this Work, the learned Author could be induced to favour the world with his improved sentiments on this subject, which could not fail of being a most useful, as well as an acceptable present to the Public. The Editors have no

P R E F A C E.

other motive for making this Work public, than a concern to find a Performance, which so far excels in method, copiousness of thought, liberality of sentiment, and judgment, all that have been before written on the subject, in danger of being lost to the world.

Near the end of 1761, and about the time when, by the academical rules of the University of Edinburgh, the Lectures on Medical Subjects ought to begin, Dr. Alston, who was at that time Professor of the Materia Medica, died. By this unexpected event, the University would have received an injury, if Dr. Cullen, who was then Professor of Chemistry, had not voluntarily offered to supply the place of Dr. Alston, in reading Lectures on the Materia Medica for that season.

This was gladly accepted, and the offer was made with greater propriety, as the study in which he was then principally engaged as a Professor, led more directly to this subject, than any other branch of Physic whatever.

It is obvious to every one's understanding, how difficult it was for the learned Author to acquit himself properly in this arduous task. Notwithstanding this discouraging circumstance, our Professor attempted a plan
entirely

entirely new and original, and executed the same in a manner which gained universal approbation. The substance of that Performance is the Work now offered to the Public, which, during an interval of eight years past, has been much desired by the Faculty, and it was long hoped that the learned Author himself would have been induced to communicate them to the world: But, it is presumed, that his other avocations and extensive practice have not afforded him sufficient leisure for such an Undertaking.

The ensuing Sheets are printed from a correct copy, which has been carefully compared with several others. If, after all, any inaccuracies in the style should have escaped, they are not, in the slightest degree, to be imputed to the Author, whose manner of expression is as pure and elegant, as the matter he delivers is great and original.

In short, the merit of the Performance stands in need of no eulogium, and the method is too clear to require explanation, especially as the original Syllabus is subjoined, with the blank spaces filled up (in *Italics*,) as directed to be done in the Course of the Lectures. This is the only material alteration that the Editors have made, and the propriety of this will scarcely be questioned.

L E C-

ERRATA

- P. 44. l. 13. *for aristolochia, read aristolochica.*
- P. 49. l. 1. *r. the food, instead of becoming acid.*
- P. 52. l. 6. *ab imo, for idiosyncrasy, r. idiosyncrasy.*
- P. 159. l. 3. *r. punctum interrogandi.*
- P. 240. l. 22. *r. is induced as the system.*
- P. 261. l. 4. *ab imo, r. Alliaris.*
- P. 302. l. 13. *r. among the Aromata, or here among the Bitters.*

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Additional P R E F A C E.

THE EDITORS, in publishing these Lectures, hoped they were not doing a thing disagreeable to the Author, but in this they were mistaken, and, soon after the Publication, found he did not approve of it; he complained that the Work was by no means sufficiently perfect to do him honour; he said it was originally imperfect, having been unexpectedly undertaken, and necessarily executed in great hurry; and it was still more imperfect from the inaccuracy of the Gentlemen who had taken these Notes of the Lectures. In short, the Doctor saw all this in so strong a light, that, as soon as he was informed of the Publication, he applied for, and obtained from the Lord Chancellor, an Injunction, prohibiting the Sale of the Book. Upon this occasion the Editors, who never meant to do any thing disagreeable to the Author, applied to himself for leave to renew the sale. The same reasons, however, which made him disapprove of the first publication, made him very unwilling to admit of it again; but finding that many copies of the book had been dispersed before the Injunction was served, being at the same time persuaded of the innocent intentions of the Editors, and solicited by several of his Friends, he has at length,

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consented to the sale of the remainder of the impression, upon this condition, that the Editors, by collating several other Manuscripts, should endeavour to correct many errors. This condition the Editors have now complied with as well as they can, and have received from several Manuscripts such improvements as occasioned the re-printing of the first sheet, and enabled them to give many corrections in other parts of the Work. They hope they have done enough to shew what might be expected from the accuracy of the Author's own hand put to such a Work, and for which they would have willingly waited, but they are assured by himself, that his other occupations, and time of life, make it very probable that he never will engage in it.

LECTURES

L E C T U R E S

O N T H E

MATERIA MEDICA, 1761.



A Knowledge of the Materia Medica comprehends a knowledge of all the substances employed in preventing or curing diseases, and therefore of all those employed either in diet or medicine. Different authors have followed different methods in delivering the knowledge of this part of science, all of them liable to objections, which need not be here pointed out. I shall shew you the plan which I intend to follow; and, if you shall be convinced of the propriety of this, you will easily see the faults of others. Most of the subjects will be considered under four different heads.

1st, The knowledge of the subject in itself, and the distinction of it from every other.

2d, Its virtues in diet or in medicine.

3d, The foundation of these virtues, so far as it can be perceived in the sensible or chemical qualities of the subject.

4th, Its pharmaceutical treatment, and other circumstances necessary to its application in medicine or diet.

With respect to the *first* head. The subjects are of two kinds, as immediately produced by nature, or as farther prepared by art. The knowledge of the *first* is to be got by the study of Natural History; the knowledge of the *second*, by an acquaintance with the arts which have been employed on them. Under the *second* head, the virtues shall be delivered, first, according to the several general indications, and then as more especially applicable to particular diseases. Here we must observe, that there is no very good foundation for many
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of the virtues which are ascribed to medicines by the writers on the *Materia Medica*. The doctrine of Signatures, the fancies of Astrology, and the mistaken application of Chemistry, have very much corrupted this part of science. Even what is pretended to be drawn from experience, as much of it has proceeded from the errors and prejudices of the ignorant, and much from the falsehood of designing men, it is very little to be trusted. The writers, however, on this subject, have commonly copied from one another; but I hope I shall be pardoned if I do not repeat after them; and indeed I shall willingly appear rather *pauca scire, quam multa opinari*. Under the *third* head, we shall find still more uncertainty. The sensible qualities of substances go but a little way towards discovering their medical virtues. The *Colour* is a very uncertain guide; the *Smell* goes but a little farther; and it is the *Taste* only that is of any extensive application. Sir John Floyer, in his *Phytobasanos*, was the first who prosecuted this study to any length; and the industrious Linnæus has since bestowed some attention upon it; but both of them, in straining to form a system, have carried the matter too far. The Chemical Analysis, strictly so called, has been found of very little use; but the treatment, by the application of different menstrua, has been of more service, and, by resolving vegetables into their gummy or resinous parts, we have been able sometimes to separate the salutary from the pernicious, and the efficacious from the inert parts of many substances. Under the *fourth* head, we shall mention the pharmaceutical treatment which medicines have commonly, or may properly receive, and, therefore, the several compositions they enter into, with some other particulars relative to their administration in diet or medicine.

Of the several plans of a *Materia Medica*, that to be found in the treatise *De viribus Medicamentorum*, imputed to the celebrated Dr Boerhaave, appears to be one of the best. It treats of the several subjects as they occur in the order of the *Methodus Medendi*; and it has premised some physiological doctrines that are necessary with respect to the whole. I find it necessary to follow this part of the plan, especially, as I have some peculiar notions on the subject, which, as they are not common in our schools, it is necessary for me to explain.

In the *first* place, we adopt the proposition very well established, *Medicamentum non agit in Cadaver*: That is to say, That the operation
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tion of medicines does not depend on the laws of matter and motion, which take place in inanimate bodies, but on a principle which subsists in living animals only. We inquire therefore after this vital principle. It must be connected with the primary and fundamental functions of the animal œconomy; but the functions of the animal œconomy are mutually so much the causes and effects of each other, and run so much in a circle, that it is difficult to chuse where to begin. Many think the circulation of the blood may be considered as the vital principle upon which all the other functions depend; but we must trace this to its cause in the action of the heart; and this again manifestly depends upon a certain power acting in or upon the muscular fibres of this organ. When we consider this power, we find it belongs, in common with those of the heart, to every muscular fibre in the whole body. At the same time, we find, that the power of muscular fibres every where depends upon the nerves; that these nerves, for what power they communicate, depend upon their connection with their common origin in the brain and *medulla spinalis*; the nerves and muscular fibres therefore form a system, whose functions may be considered as primary and fundamental in the animal œconomy. The principal part of this nervous system is manifestly the common origin, which is properly enough considered as the *sensorium commune*, as the more immediate organ of the soul. It is therefore with probability supposed, that our intellectual part, or the soul, is the vital principle of the animal œconomy. With regard to this, there is some difference of opinion, which may be supposed to influence the system of physic, and particularly the question, Whether our intellectual part depends on a certain constitution of matter, or upon an immaterial substance connected with our material part? We are of the latter opinion, and think it is fully proved, by observing, that there are laws of the animal œconomy absolutely incompatible with the ordinary powers of matter and motion. But, on this subject, I refer you entirely to Dr Whytt, who, in his book on the vital and involuntary motions of animals, has put the matter beyond all doubt. I will add only one argument, which is, That the association of ideas, a very fundamental part of all our intellectual operations, cannot be explained upon any supposed organization of matter. There is indeed something analogous to it in sounding strings, that are in a certain proportion to one another; but, if the simultaneous motions of our intellectual part depended on such a mechanism, we should find, that these simultaneous motions would

be confined to certain parts, and take place in these only; but, of the motions of living animals, any one may be associated with any other; and the association depends entirely upon the impressions producing them being made, and frequently repeated, at the same time.

The existence of a *Soul* admitted, we must next inquire into the circumstances of its operating in the system. With respect to this, we find, That the notion of the soul's governing the whole animal functions is very ancient, as we meet with it in the *Timæus* of Plato. It has since been revived in different shapes by Helmont, Wepfer, and Dolæus, and especially by Stahl, who plainly maintains, that the soul, as in a great measure independent of the body, and as in itself a rational being, presides over and directs most of the animal functions. In this he has been followed by many physicians in Germany, by Dr Nichols in England, as appears from his dissertation, intitled *Anima Medica*; and our countryman Dr Porterfield has also shewn a strong bias to the same opinion. We cannot, however, join in this with these respectable persons, as we neither find it founded in truth, nor that it can have any good influence on the system or practice of physic. Although the soul is certainly a distinct substance from the body, it appears highly probable, that the soul, while connected with the body, seldom acts, but in consequence of motions first excited in the latter; and that it is generally true, that *Nil est in intellectu, quod non prius fuerat in sensu*. Even our reflex sensations seem to depend upon certain conditions of the organ of our intellectual functions; and these conditions being given, the reflex sensations are always necessary consequences of first impressions. The impossibility of a perpetual motion or automaton being demonstrated with respect to matter, this is considered as a proof, that the seeming automaton in a living animal must depend upon a soul animating all its motions. That the soul is constantly necessary to the motions of the body, we readily admit; but the argument is pushed too far, when it is supposed that these motions are supported by the power of the soul alone; for, it appears, that motions excited by the impulse of external bodies, are absolutely necessary to that support. Take away all impressions on the external senses, and most persons will fall asleep, and that sleep would probably continue and end in death, were it not for impressions being renewed. The power of the soul appears, especially in what are called the voluntary motions; but these, properly considered, do not show that power exerted in
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an arbitrary manner, or with any attention to the motions of the body. How the Will is determined in all cases, we do not say; but, however determined, it is merely the conception of an end or purpose to be executed; and, with this, certain motions of the body are necessarily connected, without the soul's being conscious, in many cases, even of the motions of the limbs produced, and in no case of the action of the muscles which produces these motions. Anger makes me Will to give a blow; I make a full inspiration; I continue it; I bend back my body; I lift up my arm, and stretch it to the utmost; I close my fist, and bring down my arm with force upon the part I would strike; and, with all this, my limbs are set in a particular position, my eye-brows are knit, my eyes are fixed, and the features of the face are set in a particular manner. Of these several motions, the soul is very little conscious, and not at all of the several muscles employed. The soul is indeed a necessary part of these motions, but cannot be said to direct and govern them independent of the conditions of the body. This is still more clear with respect to the internal, and what are called Involuntary Motions, with which physic is more especially concerned. The Stahlans would have us believe, that the increased action of the heart and arteries which appears in fevers, does not arise from the physical power of the cause of fevers, but from hence, that the soul, perceiving the noxious tendency of some matter present in the system, excites the action of the heart and arteries as a means of expelling such noxious matter. This cannot be proved; and it appears to us more probable, that, analogous to a general law of the system, the material cause of fevers has a physical power of exciting those motions that are fitted to expel it out of the body. In short, whatever share the soul may have in supporting the motions of the body, we can have no art of physic, but in so far as we suppose, that the causes operating upon the body act by a physical necessity; and that, by a knowledge of such causes, we can produce certain changes in the state of the matter and organization of the body. We agree therefore with Dr Boerhaave, that, when a medical problem is prosecuted so far as to be carried to circumstances depending upon the connection between the soul and body, it may be considered as solved for all the purposes of physic. Upon the whole, therefore, we conclude with the same celebrated physician, that the consideration of the soul is not necessary to the system of physic; Inst. Med.

Med. Art. 696. And, laying aside the doctrine of the Stahlans, we return to consider the animal œconomy under another view.

We have hinted already, that the functions of the *sensorium commune* are fundamental in the system. It is connected with the extremities of the nerves every where, so that, by an impression made upon certain of these extremities, a motion is propagated from thence to the sensorium; in consequence of which, a sensation arises; and, by sensations arising in the sensorium, a motion is propagated from thence to certain extremities connected with muscular fibres, whereby these are excited to contraction. Those parts of the body upon which impressions made give occasion to sensation, are said to be sensible; and those parts which are excited to motion by impressions made upon them, or upon the sensorium, are said to be irritable. Now, it is pretty obvious, that most of the motions of the body depend upon the action of irritable parts; and as in many cases the action of these parts is only excited in consequence of sensations, or other powers acting on the sensorium, it is plain, that most of the functions of the body depend upon a communication of motion by means of the nerves. This may be called the Nervous Power; and its nature has been variously judged of. It is perhaps not very necessary to determine it; but we shall venture to say, that it is probably a subtile elastic fluid inherent in the whole medullary fibres of the nervous system; and that this is probably the material vital principle of animals. Somewhat analogous to it appears in vegetables, many of which are manifestly endowed with irritability. Perhaps it is common to all nature, and only under different modifications by certain conditions of other matter.

The sensibility and irritability of the system, as depending upon a nervous power, being in general established, it is of importance to determine, what parts are more especially endowed with these properties. Irritability is evident wherever we can distinctly observe the presence of muscular fibres, as in the organs of voluntary motion, in the heart, the bronchiae, and alimentary canal; and in some parts, where the muscular structure is not quite evident, experiment has shown the irritability, as in the lymphatic system, and in most of the excretories. The irritability of these last appears in every excretion, that of sweat excepted; for this seems especially, or only, promoted by the increased action of the heart, while every other is
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by an irritation applied to the excretories themselves ; and not only by applications to the excretories, but also by those applied to other parts having a sympathy with particular glands : Thus, certain sounds can occasion an increased excretion of saliva, and a fractured scull increases the evacuation of bile. The important question on this subject is, Whether the arteries are endowed with irritability ? It is alledged by some anatomists, that what has been called the muscular coat of the arteries consists only of fibres, such as are in the tendons or ligaments, and which are no where else sensible or irritable ; that, in experiment, the arteries do not appear irritable by mechanical stimuli ; and though they appear to contract upon the application of strong acids, this is no more than what happens to the veins, and even to the fibres of dead animals. But, on the other hand, it is said, that, if the arteries are simple elastics, the state of the circulation in every part of the body must, for the most part, depend upon the action of the heart alone ; and, if the impetus of the blood be increased in one part only, while the action of the heart continues the same, it will be difficult to account for it upon that supposition. Thus, in blushing, the impetus of the blood is increased in the vessels of the face, and in those of the cheeks more particularly. Now, if this depended upon the increased action of the heart, the redness produced should appear over the whole surface of the body ; and, if it depended on certain circumstances in the state of the respiration, the effect should appear equally over the whole superior parts ; but neither of these happen ; the effects are truly partial, and they are only to be accounted for by supposing, that the arteries are endowed with irritability and a muscular power, which can be increased in particular parts of them, while the action of the heart and other arteries continue the same as before. Dr Haller endeavoured formerly to account for these inequalities in the state of the circulation, by the contraction of the nerves surrounding several arteries ; but, perceiving that truly the nerves are endued with no contractility, he has entirely given up that theory.

Having thus pointed out the extent of irritability, and of the effects of a nervous power in the system, it is evident, that the laws by which the action of the nervous power is regulated require to be attended to, and studied more carefully than hitherto they have been. We shall not attempt to supply this at present ; but shall endeavour to do somewhat, as particular subjects may give occasion to it.

it. Just now we shall only make some general application of what has been said. *First*, With regard to the solids of the body, the state of laxity or rigidity in the simple solids has had a great share in our modern pathology; and we think that the consideration is not to be neglected altogether; but, at the same time, think, that the laxity or rigidity of the simple solids being given, it is not readily or occasionally changed; and that all sudden and occasional changes in debility or strength, contractility or flaccidity, are more probably referred to the state of the moving fibres under the influence of the nervous power: *Quam facile mille res turbant.*

Secondly, Every change in the state of the fluids poured out, has been considered as depending upon the state of the fluids in the vessels; and it may be so in some cases. But, as it is probable that the secreted fluids are chiefly formed in the secretory organs, so it is certain, that the state of the secreted fluids is changed by the relaxation or constriction of the secretory vessels; and, therefore, the fluids poured out are more frequently a mark of the state of the moving powers than of the general condition of the fluids. Thus, the urine, which has been so long considered as a mark of the state of the circulating fluids, is however, for the most part, no other than a mark of the state of the secretory organ.

The *third*, and only other application we shall make of the consideration of the influence of the nervous system, is to observe, that, as the whole of the sensible and irritable parts have a connection with the sensorium, so certain parts have a more particular connection with certain others. This connection, sympathy, or consent, has been oftentaken notice of; but not so accurately and fully as is to be wished. At present I shall mention only one instance, viz. that of the stomach, as it is to be more particularly regarded in accounting for the operation of medicines. Nothing affects the mind more than the state of the stomach, and nothing draws the stomach into sympathy more than affections of the mind. This is evident in hypochondriac people, whose disease being chiefly seated there, has often grievous effects on the *sensorium commune*, or the seat of it, the head. This is farther illustrated by wounds of the head. Does not, in these cases, the vomiting of bile proceed from consent between the stomach and liver? 2dly, The stomach has a considerable connection with the viscera of the thorax, abstracting from its contiguity or distention. In hypochondriac cases, the heart and lungs are often
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variously affected by the stomach. Convulsions of the diaphragm are often occasioned by slight irritations of the cardia. Many other morbid symptoms might be adduced in proof of the same thing, were it necessary. 3dly, The stomach is connected with the abdominal viscera, and first with the intestines; secondly, with the other contiguous as well as more distant organs. 4thly, This viscus is connected with the extremities. This I have often experienced in myself, by transition of the gout, from the feet to the stomach, and *vice versa*. Cold and heat likewise applied to the extremities, affect the stomach. 5thly, It is connected with the whole surface of the body, and seemingly with the extreme vessels every where. This is demonstrable by many observations; *e. g.* no sooner do some aliments reach the stomach of *particular* persons, than spots and efflorescences are occasioned on the skin. Van Swieten gives such an instance from crabs eyes. I myself had a patient labouring under the *malum hypochondriacum*, who was relieved of his complaints by pimples appearing between his thumb and finger, and as immediately *oppressed* by their retropulsion, or disappearing. Vomiting from constriction of the cutaneous pores is another instance of such sympathy. Such symptoms, therefore, are falsely attributed to acrimony; and in general we conclude, that the stomach has a very general consent with the whole system.

Operation of medicines depends somewhat on their own nature, but as much on the particular modification of the system to which they are applied. Instead, therefore, of spending time, in examining the different *figure* of the particles of medicine, their sharpness, oiliness, &c. it will be more useful to say somewhat on temperaments. Temperament is the general state of the system; idiosyncrasy the *peculiar* state of a *particular* part. The variety of temperaments is prodigious. The ancients have confined them to four, and we, through a blind attachment to antiquity, have made few farther advancements in this distinction. It would be difficult to enumerate all the different temperaments; I shall therefore consider, rather, the several particulars in the system that are apt to be varied in different

different constitutions, and whose varieties constitute diversity of temperaments. These particulars may be reduced to five. 1. The state of the simple solids. 2. The proportion of the fluids to the solids. 3. The state of the fluids. 4. The distribution of the fluids; *i. e.* of particular determination to this or that part of the system. 5. The state of the nervous power.

1. As to the state of the *simple solids*, viz. their laxity, or rigidity. Under the first is comprehended flaccidity, and debility; under the last elasticity, and strength. It may be doubted, whether these should be taken in here, as they are variable in every person, and, through the whole course of life, growing gradually from lax to rigid, as age encreases, and therefore might be supposed not to affect temperaments. Something, however, depends on the primitive stamina, in the formation of temperaments; *e. g.* two children, born at the same time, brought up exactly under the same management, will differ very considerably, as to the state of their simple fibres.

Universally, Physicians have taken their mark of the state of the simple solids from the hair. In a case of laxity the hair is soft, and in small quantity. In case of rigidity, it is copious, and liable to crispature and curling. The paler colours are, in general, an indication of laxity; as the black, in all its shades, is an evidence of rigidity. Thus, in children, the hair is generally soft and pale, and gains, by age, hardness, and a darker colour. Another mark of distinguishing the nature of the simple fibres, is the softness and hardness of the fleshy parts. When the body is fleshy, and the muscles and tendons distinctly *marked*, and along with this a considerable *strength of system*, we infer a rigidity of the simple fibres, with a considerable exertion of the nervous power. Succulency, for these reasons, must be a symptom of laxity.

2. The proportion *between solids and fluids*. There has been nothing so much talked of as plethora, and yet it has been commonly confounded with *obesity* and corpulency. There is, however, a manifest *difference*, though difficultly distinguished by particular marks, and

and at the same time a connection. Plethora implies a greater quantity of fluids *circulating* in the vessels, distinguishable by ruddiness of colour, and a number of veins distended over the body. Of obesity, the greater proportion of it *lies without the laws of circulation*. Hence plethora may cause obesity, as in the plethora, if a greater quantity be secreted, and not let off from the body, it will press upon the vessels, and cause obesity.

3. *The state of the fluids.* These, in my opinion, might be disregarded, as they depend on the state of the solids and the nourishment. But we must not disregard what the Ancients have assigned as the cause of the different temperaments, which they made to depend on four different humours. This doctrine, however, of the Ancients, is now almost entirely neglected. The Chemists have delivered nothing clear or precise on this head, from the different proportions of oil, earth, salt, &c. in the blood. They have even added mercury and iron, as the latter is found in all human blood. But we are not assured of other principles, viz. red globules, coagulable lymph, and serosity, which last is water impregnated with a saline principle. These, I make no doubt, are in different proportions, from the nature of the aliment or diseases. But I do not know how to make use of this, at least till we be more fully acquainted with the *nature* of these *proportions*, and the proper methods of distinguishing them, which are at present very inaccurate and imperfect; *e. g.* the proportion of red globules is not to be distinguished, as their *less* or *greater florid colour* depends not on their quantity, but on the state of diffusion. Again, the proportion of coagulable lymph is not even evident from *consistence*, as in persons where there is the same quantity of serum, the consistence is different. Ligature on the vessels, child-bearing, &c. cause a different degree of separation of coagulable lymph, &c. so that no person can make any accurate judgment from appearance of the blood. Density is a more certain mark. The blood is denser in proportion to rigidity of the vessels, and in the same species in proportion to the age; *e. g.* it is more dense in cows than calves, &c.

The *quantity* of saline matter may also affect the density of the blood, and therefore we cannot positively determine whether the fluidity of the blood, in particular cases, be owing entirely to the pure watery part, as the saline principle may contribute considerably towards the production of that quality.

4. *Distribution of the fluids.* This is different in the same person, according to his age, owing to a difference in the structure and distribution of the vessels. It seems to be necessary that the brain should be brought to its size quickly; hence the head in a foetus is much greater in proportion to the other parts, and then constitutes one-fifth of the whole; whereas in an adult it does not exceed one-ninth, and, frequently, one-tenth only. After birth, a new determination is given to the circulating fluids; the circulation being stopt in the umbilical vessels, is determined to the iliacs, and hence the growth afterwards of the lower extremities is more remarkable. This accounts for hæmorrhages, &c. which happen in different parts of the body, at different periods of life, *e g.* bleeding of the nose in young persons. Again, if a tall person have not hands and feet proportionate to the length of his body, he is liable to diseases. Thus I have seen a *phthisis pulmonalis*, of which this disproportion was the most probable cause. Hence if we could ascertain the proportions of the human body exactly, we might form a notion how diseases might arise according to the various deviations from it.

We shall now take notice of the different distribution into the arterious and venous systems. The arteries are larger in proportion to the veins in the young than in old subjects. Wintringham, jun. finds the density of the arterious coats less in young than in old people. The arteries, therefore, from being laxer, grow more rigid, and are laxer as nearer to the heart. All this is wisely ordered; for the arteries being more exposed to the *action* of the heart, and the fluids, in their moving from a greater to a lesser diameter, are sooner rendered rigid, than the veins, in which the power of the heart is weaker, and the fluids move in a contrary manner.

manner. Hence arises in young persons the *arterious*, in old the *venous plethora*, a distinction commonly unobserved, though it gives a considerable difference in point of temperament. Arterious plenitude is distinguished by the florid complexion, the venous by distension of veins and paleness of the body. This change of plenitude is gradually taking place in all people, though the degree of it is considerably varied in different persons.

We consider here, very properly, the proportional capacity and force of the heart in regard to the system, at different times of life, as also the proportion of the lungs to the rest of the body: For as the same quantity of fluids, in a given time, passes through them, as through the *whole body*, any large proportion of fluids in the system must of necessity be very sensibly felt *there*, and, consequently, have an effect in the production of temperament. Thus narrow chested people are more subject than others to hæmoptoë and congestion in the lungs.

5. *Different state of the nervous power*, with regard to sensibility, irritability, celerity, mobility, and strength. By sensibility we mean the different forces of impression necessary to move different persons: By irritability the extent of the sensation; *e. g.* two persons, on taking the same dose of an emetic, will be very differently affected; the one vomiting easily, without any farther *extent* of the impression, the other being pretty generally convulsed over the *whole* system. Of the difference of sensibility we are able to judge but grossly, as it does not depend entirely on the degree of force impressed, but is greatly improveable by custom and practice; *e. g.* there may be two persons equally sensible to the smallest impressions of any sapid body on the tongue, and yet the one may be able only to distinguish green tea from bohea in infusion, while the other cannot only tell when a number of *different species* of the same kind of tea are employed in infusion, but also the different proportion in which the teas are employed. The same thing may be
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illustrated by musical tones: Thus one person may be sensible to as soft an impression of sound as another, but, unless conversant in music, he will not be able to distinguish a variety of tones. Irritability must absolutely be connected with sensibility, as being both excited from the same cause; the one making us sensible of the *simple* impression, the other *propagating* the sensation over the body. Irritability is often connected with weakness of the nervous power; sensibility, more remarkably with its strength: Independent of the nervous power, irritability is also varied in proportion to greater or less tension of the moving fibres: The more accurately, therefore, the vessels are *filled*, the fibres will be more stretched, and the irritability greater.

Another particular, in which there may be a difference of the nervous power, is in *mobility* or *celerity*, with which actions are excited. This may be different, even when the sensibility and irritability are the same, though it is generally connected with them, as mobility is greater in more sensible and irritable systems. Another variation of the nervous power is the *duration of impressions*. In some the effects of impression are transitory, and therefore the body is left open to new. This is called levity. In others these effects are longer of *duration*, and the motions excited are more steady. Lastly, the nervous power differs in point of strength. Some have supposed this to depend entirely on the state of the *simple fibres*, and, indeed, I allow, that it is often connected with it. But most of the changes of debility and strength are owing to changes in the nervous power. Thus at the invasion of fevers, where we cannot suppose any change in the state of the simple fibres, we see often remarkable debility in performing the functions, connected also with an increased irritability. Again, in maniac persons there is often an incredible degree of strength exerted, which we cannot possibly conceive to proceed from rigidity of simple fibres, so suddenly produced. This strength of the nervous power is opposed to sensibility, as appears from a much stronger dose of any medicine being required, to produce

duce the same effects on the above-mentioned maniac than other persons. In my opinion it is also opposed to irritability, though not so remarkably, for weakly systems are, *cæteris paribus*, more irritable. Strength of nervous power is also opposed to mobility, for the more weakly the subject the impressions are more transitory, whereas in strong people the contrary takes place.

Having thus enumerated the different causes of temperament, we shall now consider how these causes are variously combined, in order to form different temperaments. Of particular temperaments, those are most strongly marked, which are owing to the different stages of life. As changes in the system take place very gradually, it were proper to assume a middle point, to and from which the system is gradually advancing or declining, and at the same time to mark the different gradation of decline and advance; but as this would be very difficult, I shall only handle the matter grossly, and point out those stages where the most remarkable changes occur. These may be reduced to four, Infancy, Youth, Manhood, and Old Age. To begin with these, therefore, in their order.

I N F A N C Y.

In Infancy occur remarkably lax solids, large proportion of fluids which are watery and bland; large proportion of blood in respect to cellular substances: Head and heart large in proportion to the system: Arteries numerous and large in respect to the veins: The secretory glands have not yet attained to their full bulk, while the conglobate, or lymphatic, are larger than at any other time of life. In the nervous system there is exquisite sensibility, without accuracy of perception; remarkable irritability with weakness, great mobility, the foundation of a great deal of levity. In general, the nervous system is strong, with respect to the present time of life, but weaker than in a more advanced period.

Secondly.

Secondly. Let us consider now

YOUTH *approaching near to its* ACME.

Rigidity and *strength* are now greater, but still, with respect to the middle point, laxity prevails; a less proportion of fluids, with respect to the vessels, but still prevailing humidity; increased cellular substance, on which the growth of the body chiefly depends till the Acmé, and long after; heart less in proportion to the system than formerly, and more in a ballance with it; the arteries are diminished, in some measure, with respect to the veins, but still exceed them; the whole viscera are larger, and particularly the lungs, and, as the vessels are more rigid, consequently a greater determination of fluids to that organ, which explains the diseases incident to the stage of life, hæmoptoïsis, peripneumony, &c. The same sensibility and irritability continue, perhaps, as before, but the former is more accurate, from the tension of the vessels, and consequently the fibres. The latter is rather encreased, and hence irascibility more frequently appears at this period. There is also great mobility, but with much less levity.

Thirdly. We come to examine the state of

MANHOOD.

It is difficult to fix this period; different persons attaining their Acmé at different times. I would take the thirty-fifth year for a standard. The solids are now tending to excess of rigidity, with respect to the middle point; the fluids are less, in proportion to the solids, hence dryness begins to take place; the heart is smaller, with respect to the arteries, and exerts less force than formerly; hence slower circulation, more copious secretion, and obesity, with consequent succulency. Hitherto little change has happened in the state of the fluids, but now they begin to tend towards acrimony.
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The arteries now become less, and the ballance is turned to the side of the veins: The secretory glands are now increased, while the lymphatic vessels are diminished, as also the conglobate glands: Sensibility, irritability, mobility, and consequently celerity and levity, gradually diminish from this time. Till this period the strength has been gradually encreasing, but is now at its height, and afterwards decays, chiefly on account of the rigidity of every part of the system. In infants the muscles consist of truly muscular fibres, or with very little tendon; but now the tendinous exceed the muscular parts, and in proportion perhaps the force is diminished. This state of manhood is very variable as to its period, happening in some sooner, in others later; but from this to fifty, the changes are less remarkable than at any other state of life.

Fourthly,

O L D A G E.

When this comes on we cannot assign exactly, but when it *does* appear, rigidity is in excess. Dryness, proceeding from the small proportion of fluids, both in the circulatory vessels and cellular membrane. Acrimony of the fluids is in excess, *perhaps to compensate for the want of fluidity* in the blood, by diminishing its cohesion. Instead of an *arterious*, a *venous* plethora obtains. The lymphatic system almost disappears. Both from weakness of the nervous power, and rigidity of the simple solids, sensibility, irritability and mobility, formerly so remarkable, are now greatly diminished.

Thus have we pretty well distinguished the four grand stages of life, by the changes which are observed to take place in the system. These different changes do not happen so uniformly, but some peculiarities are remarkable through the whole of life. Thus each sex is distinguished. In the female, there is greater laxity, with humidity and thinness of the fluids, arterious plethora, more sensibility, irritability, levity and weakness, so that in them the character of youth continues longer than in the male. In every person

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are appearances of a temperament peculiar to himself, though the Ancients only took notice of four, and some have imagined these were deduced from the theories of the four humours, or four cardinal qualities; but it is more probable that they were first founded on observation, and afterwards adapted to those theories, since we find that they have a real existence, and are explicable on the doctrine already delivered. The two that are most distinctly marked, are the Sanguineous and Melancholic, viz. the temperaments of Youth and Age.

S A N G U I N E O U S.

Here there is laxity of solids, discoverable by the softness of hair and succulency; large system of arteries, redundancy of fluids, florid complexion; sensibility of the nervous power, especially to pleasing objects; irritability from the plethora, mobility and levity from lax solids. These characters are distinctly marked, and they are proved by the diseases incident to this age, as hæmorrhages, fevers, &c. but these, as they proceed from a lax system, are more easily cured.

M E L A N C H O L I C H A B I T.

Here greater rigidity of solids occurs, discoverable by the hardness and crispature of the hair; small proportion of the fluids, hence dryness and leanness; smaller arteries, hence pale colour; venous plethora, hence turgescency of these, and lividity; sensibility, frequently exquisite, but with great accuracy; moderate irritability, with remarkable *tenacity* of impressions; steadiness in action and slowness of motion, with great strength; for excess of this constitution in maniacs gives the most extraordinary instance of human strength I know. This temperament is most distinctly marked in old age, and in males. The sanguineous temperament of youth makes us not distinguish the melancholic till the decline of life, when it is very evident, from diseases, (of the veins,) hæmorrhoids, apoplexy,

apoplexy, cachexy, obstructions of the viscera, particularly of the liver, dropsies, affections of the alimentary canal, chiefly from slower and weaker influence of the nervous power. So much for the sanguineous and melancholic temperament; the other two are not so easily explained. The Choleric temperament takes place between Youth and Manhood. In the

C H O L E R I C,

the distribution of the fluids is more exactly ballanced; there is less sensibility, and less obesity, with more irritability, proceeding from greater tension; less mobility and levity, and more steadiness in the strength of the nervous power. As to the

P H L E G M A T I C:

This temperament cannot be distinguished by any characters of age or sex: It agrees with the sanguineous in laxity and succulency; it differs from that temperament, and the melancholic, by the more exact distribution of the fluids. Again, it differs from the sanguineous, by having less sensibility, irritability, mobility, and perhaps strength, though sometimes, indeed, this last is found to be great.

These are the *ancient temperaments*, which we have brought in as instances of the combinations which might take place. The temperaments, indeed, are much more *various*, and very far from being easily marked and reduced to their genera and species, not only on account of variety of temperaments themselves, but also on account of Idiosyncrasy. The whole of this subject might be prettily illustrated by considering the difference of genius, &c. and even morals, to which the different temperaments are liable; but, as this disquisition is very subtle, and does not properly belong to this place, I shall wave it on this occasion.

To conclude; these circumstances, which we have observed to concur chiefly in production of temperaments, were the more necessary to be taken notice of, as they give indications in the cure of diseases, and so may influence what we have to say on the subject of medicines; but as we have found that the nervous power alone is capable of considerable and sudden changes, it is to this that our medicines should be chiefly directed; for the state of the simple solids, the proportion and state of the fluids, and the distribution of these, we have little in our power. *E. g.* 1. Medicines which act on the simple solids, cannot propagate far their effects on the system. 2. The proportion between the solids and fluids is easily altered by diet and manner of life, therefore it is not a predominant part of temperament, and so medicines can have little effect on it, as the *chief* causes of temperament are also often the chief causes of diseases; often medicines are given to little purpose, unless directed to their causes. 3. As to the state of the fluids, I shall treat this more fully afterwards, and shall only say at present, that medicines can have but little effect upon them, and any changes we can produce are so by diet, and therefore must be slow. 4. The distribution of the fluids is scarcely to be altered, but by the gradual progress of life, and therefore is most of all out of the reach of medicines. 5. The state of the nervous power, and particularly *irritability*, is what medicines chiefly affect, and being that part of temperament which mostly modifies that operation, we shall insist upon it in particular. Haller, in 2d vol. of the *Elem. Physiol.* has treated on Temperaments; I therefore beg you would compare what I have said on this subject with his observations. We now go on to consider the influence of Idiosyncrasy and the effects of Custom, as the doctrine of temperaments is every where perplexed and confounded with these.

IDIOSYNCRASY.

Idiosyncrasy is a peculiarity of temperament in a particular part of the system; *e. g.* Error on the side of laxity, or rigidity, or having a larger

larger or less proportion of fluids to the solids. The state of the fluids also is often affected by idiosyncrasy, being different in different constitutions, owing, as I believe, to peculiar ferments operating in the system: Thus a putrefactive ferment may occasion a greater alkalescency of the fluids even in a person who lives on vegetable diet, than in one who feeds on animal food. Idiosyncrasy chiefly shews itself, by a peculiar sensibility or irritability of a particular part, which renders that part susceptible of weak impressions of one kind, and not of another; thus I have known a person faint at the smell of mutton, which we will allow to be a very singular idiosyncrasy. No part of the system is exempt from idiosyncrasy: It is needless to enumerate them all, as you may do it yourselves by examining the diseases on which they evidently depend. Nothing is more necessary than to observe, that the operation of medicines is as much or much more connected with idiosyncrasy than with temperament. In short, it has such an effect on the operation of medicines, that we should never give a dose of any efficacious one, without previously examining whether the patient has any such peculiarity, that contraindicates either the medicine itself, or its usual dose: And if the patient have not yet experienced this medicine, it will be proper, as idiosyncrasy is often hereditary, to enquire if any such have ever affected his parents.

We are next to observe, that both temperament and idiosyncrasy may be variously affected by *Custom*, insomuch that by this any temperament may be corrected, confirmed, obliterated, or even a new one induced.

C U S T O M .

Every body knows the effect of Custom, in the moral as well as the natural world, and therefore, without regarding these effects, we cannot be said to have fully handled the doctrines of temperaments and idiosyncrasy. Our time will only, however, allow to give the great outlines of this subject, which you afterwards may fill up

up at your leisure. Custom is the frequent *repetition* of impressions on the system. Custom is often confounded with habit. *Habit* is only the effect of Custom, as when frequent repetition of impressions *has given Laws to the system*. The effects of custom may be reduced to five heads. 1. On the simple solids. 2. On organs of sense. 3. On moving power. 4. On the whole nervous power. 5. On the system of blood vessels.

I.

Effects on the simple solids. Custom determines the degree of flexibility, of which they are capable. By frequently repeated flexion, the several particles of which these solids consist, are rendered more supple and moveable on each other. A piece of catgut, *e. g.* when upon the stretch, and having a weight appended to its middle, will be bended thereby perhaps half an inch; afterwards, by frequent repetitions of the *same* weight, or by *increasing* the weight, the flexibility will be rendered double. The degree of flexibility has a great effect in determining the degree of oscillation, provided that *elasticity* is not *affected*; if it go *beyond* this it produces flaccidity. Again, Custom determines the degree of tension; for the same elastic chord that now oscillates in a certain degree of tension, by frequent repetition of these oscillations, it will be so far relaxed, that the extension must be renewed, in order to produce the same tension, and consequently the same vibrations as at first. This appears in many instances in the animal œconomy, as when different muscles concur to give a fixed point, or *tension* to each other; and thus a weakly child totters as it walks, but by giving it a weight to carry, and by thus encreasing the tension of the system, it walks more steadily. In like manner the fullness of the system gives strength, by *distending* the vessels every where, and so giving tension; hence a man, by good nourishment, from being weak, acquires a great increase of strength *in a few days*; and, on the other hand, evacuations *weaken* by *taking off* the tension. These are the chief effects of tension of the system. What I have here said must not be *strictly* applied to the simple fibres, as, perhaps, it belongs partly to the moving fibres.

2. *Effects*

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Effects on the organs of sense. Repetition gives a greater degree of sensibility, *in so far only* as it renders perception more accurate. Repetition alone gives lasting impressions, and thus lays the foundation of memory; for single impressions are but retained for a short time, and are soon forgot. Thus a person, who at present has little knowledge of cloths, will, by frequently handling them, acquire a skill of discerning them, which to others seems almost impossible. Many are apt to mistake this for a nicer *sensibility*, but they are much mistaken; for it is an universal law, that the repetition of impression renders us less acute. This is well illustrated by the operation of medicines; for all medicines which act on the organs of sense must, after some time, be increased in their dose, to produce the same effects as at first. This affords us a rule in practice with regard to these medicines; it becoming necessary, after a certain time, to change one medicine even for a weaker of the *same nature*. Thus medicines, which even have no great apparent force, are found, by long use, to destroy the sensibility of the system to other impressions. But to this general rule, that, by repetition, the force of impressions is more and more diminished, there are some exceptions. Thus I have known persons, by a strong emetic, render their stomachs so irritable, that one-twentieth of the first dose was sufficient to produce the same effect. This, I believe, oftner takes place when the vomit is repeated *every day*, or *oftner*, as I have sometimes seen; for if the same vomit be given at pretty considerable *intervals*, the general rule is observed to hold good. Thus two contrary effects of habit are to be noted; and it is proper to observe, that the greater irritability is more readily produced when the first impression is *great*, as in the case first given of the strong emetic. This may be farther illustrated by the effect of fear, which is commonly observed to be diminished on repetition, which can only be attributed to custom; while, on the other hand, there are instances of persons, who, having once got a *great* fright, have for ever after continued slaves to fears excited by impressions of the like kind, however slight, which must be imputed entirely to *excess* of the first impression, as has been already observed. The determining the
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force of impressions from the relation they have to each other, is necessary to be taken notice of here. In this manner the *want* of any particular sensation becomes uneasy. Weak sensations approaching to this *want* are therefore disagreeable. Very strong sensations are, on the other hand, disagreeable likewise, because pleasant sensations are generally of a *middle force* of impression, though, no doubt, they sometimes depend on the nature of the impression. The reflex sensations of pleasure and pain are mutually exchangeable by repetition, in consequence of the force being diminished or augmented. Thus tobacco, certainly at first very unpleasant, by custom is rendered very soon agreeable. The pleasing *middle* impressions become at last *insipid* by repetition. Hence the love of novelty. Not only are our sensations varied in this manner, but they also, in some measure, depend on *relation*. Thus, according to the state of the body, the same thing feels *cold* at one time, and *warm* at another. Pleasing objects also vary in the same manner. Much use has been made of heat and cold in philosophy, and many endeavours made to establish a positive nature in each. What I have now said contributes, among other arguments, to show they are purely *relative*. This leads me to an observation I formerly made, that increased density and rigidity of our fibres *diminishes* sensibility, which, *cæteris paribus*, is observable at all periods of life; so that, in this view, *cold* not only operates on our system by *repetition*, but also by contracting the solids and rendering them more rigid: While *heat* has the contrary effect, of encreasing sensibility, by *relaxation*. To this head also belongs the association of ideas, which is the foundation of memory and all our intellectual faculties, and is entirely the effect of custom; its influence even on morals is very great, but the consideration of it does not properly belong to this place. With regard to the body also, these associations often take place. E. g. A disagreeable medicine will cause a nausea, or even vomiting, and ever afterwards the sight of it will produce the same effects. We shall only make one application of this in the cure of diseases, which very much depends on avoiding irritation. It is necessary, therefore, in such cases, to avoid not only the irritating or exciting cause, but also every

every other which have been any way connected with it. Thus when maniacs are strongly affected with the sight of any one person, we must not only keep the person out of their sight, but every other, who, being often seen with that person, might recall him to their remembrance. Again, in producing effects on the body, associations seemingly opposite are formed, which, through custom, become absolutely necessary, *e. g.* A person long accustomed to sleep in the neighbourhood of a great noise, is so far from being incommoded on that account, that afterwards such noise becomes necessary to produce sleep. It will be of use to attend to this in practice, for we ought to allow for, however opposite it may seem at the time, whatever usually attended the purpose we designed to effect. Thus, in the instance of sleep, we must not exclude noise when we want to procure rest, or any causes which may seem opposite to such an effect, provided custom has rendered them necessary.

3.

Effects of Custom on the moving fibres. A certain degree of tension is necessary to motion, which is to be determined by custom, *e. g.* A Fencer, accustomed to one foil, cannot have the same steadiness or activity with one heavier or lighter. It is necessary also that every motion should be performed in the same situation, or posture of the body, as the person has been *accustomed* to employ in that motion. Thus, in any surgical operation, a certain posture is recommended; but if the operator has been accustomed to another, such a one, however awkward, becomes necessary afterwards to his right performance of that operation.

Custom also determines the degree of *oscillation*, of which the moving fibres are capable. A person accustomed to strong muscular exertions is quite incapable of the more delicate. Thus writing is performed by small muscular contractions; but if a person has been accustomed to stronger motions with these muscles, he will write with much less steadiness.

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This subject of tension, formerly attributed to the *simple fibres*, is probably more strictly applicable to the moving; for, besides a tension from flexion, there is also a tension from *irritation* and *sympathy*; *e. g.* The tension of the stomach from food, gives tension to the whole body. Wine and spirituous liquors give tension; *e. g.* a person that is so affected with *tremor* as scarcely to hold a glass of any of these liquors to his head, has no sooner swallowed it, than his whole body becomes *steady*, and after the system has been *accustomed* to such stimuli, if they are not applied at the usual time, the whole body becomes flaccid, and, of consequence, unsteady in its motions.

Again, custom gives *facility* of motion. This seems to proceed from the distension which the nervous power gives to the moving fibres themselves. But in whatever manner it is occasioned, the effect is obvious, for any new or unusual motion is performed with great difficulty.

We have shewn that sensation depends on a communication with the *sensorium commune*, by means of organs sufficiently distended with nervous influence. We have likewise found, that sensibility is *diminished* by repetition. I am now to observe, that in some cases it may be *increased* by repetition, owing to the nervous power itself flowing more easily into the part, on account of custom. Attention to a particular object may also determine a greater influx into any particular part, and thus the sensibility and irritability of that particular part may be increased.

But with regard to *facility* of motion, the nervous power, no doubt, flows most easily into those parts, to which it has been accustomed: But facility of motion does not *entirely* depend on this, but in part also on the concurrence of the action of a great many muscles; *e. g.* *Winslow* has observed, that in performing any motion a number of muscles concur to give a fixed point to those intended *chiefly to act*, as well as to *others* that are to *vary* and *modify* their
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their action. This, however, is assisted by repetition, and the freer influx, as, by experience, we know the proper attitude for giving a fixed point, in order to perform any action with facility and steadiness.

Custom gives a spontaneous motion also, which seems to recur at stated periods, even when the exciting causes are removed. Thus, if the stomach has been accustomed to vomit from a particular medicine, it will require a much *smaller* dose than at first, nay, even the very sight or *remembrance* of it will be sufficient to produce the effect; and there are not wanting instances of habitual vomiting, from the injudicious administration of emetics. It is on this account that all spasmodic affections so easily become habitual, and are so difficult of cure, as we must not only avoid all the exciting causes, even in the smallest degree, but also their associations.

Custom also gives *strength* of motion: Strength depends on strong *oscillations*, a free and *copious influx* of the *nervous power*, and on *dense solids*. But in what manner all these circumstances have been brought about by repetition, has been already explained. The effect of custom, in producing strength, may be thus illustrated: A man that begins with lifting a calf, by continuing the same practice every day, will be able to lift it when grown to the full size of a bull.

All this is of considerable importance in the practice of Physic, though but too little regarded; for the recovery of weak people, in great measure, depends on the use of exercise, suited to their strength, or rather *within* it, frequently repeated and gradually increased. Farther, it is necessary to observe, that Custom regulates the particular celerity with which each motion is to be performed; for a person accustomed, for a considerable time, to one degree of celerity, becomes incapable of a greater; *e. g.* A man accustomed to slow walking will be out of breath before he can *run*

twenty paces. The *train*, or order, in which our motions are to be performed, is also established by Custom; for if a man hath repeated motions, for a certain time, in any particular order, he cannot afterwards perform them in any other. Custom also very frequently *associates* motions and sensations: Thus, if a person has been in use of associating certain ideas with the ordinary stimulus, which in health excites urine, without these ideas the usual inclination will scarce excite that excretion; and, when these occur, will require it even in the absence of the primary exciting cause; *e. g.* It is very ordinary for a person to make urine when going to bed, and if he has been, for any length of time, accustomed to do so, he will ever afterwards make urine at that time, though otherwise he would often have no such inclination: By this means some secretions become, in a manner, subject to the will. The same may be said of going to stool: And this affords us a good rule in the case of costiveness; for by endeavouring to fix a stated time for this evacuation, it will afterwards, at such time, more readily return. It is farther remarkable, that motions are inseparably associated with other motions: This, perhaps, very often proceeds from the necessary degree of tension, but it also often depends merely on Custom, an instance of which we have in the uniform motions of our eyes.

On Custom depends the strength and steadiness, perhaps, of all the internal functions, as, *e. g.* the heart, which probably was once under the power of the will*. So much for the power of Custom on the moving fibres.

4.

Effects of Custom on the whole nervous power. We have found that, by Custom, the nervous influence may be determined more easily into one part than another, and therefore, as all the parts of

* This steadiness, produced by Custom, serves a good purpose, as otherwise the heart, being under the power of the will, would be too liable to its passions.

the system are strongly connected, the sensibility, irritability, and strength of any particular part, may be thus increased. Custom also has the power of altering the natural temperament, and of inducing a new one. It is also in the power of Custom to render motions periodical, and periodically spontaneous. An instance of this we have in sleep, which is commonly said to be owing to the nervous power being exhausted, the necessary consequence of which is sleep, *i. e.* a rest of the voluntary motions to favour the recruit of that power: But if this were the case, the return of sleep should be at different times, according as the causes which diminish the nervous influence operate more or less powerfully; whereas the case is quite otherwise, these returns of sleep being quite regular. This is no less remarkable in the appetites, that return at particular periods, independent of every cause but Custom. Hunger, *e. g.* is an extremely uneasy sensation, but goes off of itself, if the person did not take food at the usual time. The excretions are farther proofs of this, *e. g.* going to stool, which, if it depended on any particular irritation, should be at longer or shorter intervals, according to the nature of the aliment. There are many other instances of this disposition of the nervous influence to periodical motions, as the story of the Idiot of *Stafford*, recorded by Dr. Plot, (*Spectator*, N^o 447.) who, being accustomed to tell the hours of the church clock, as it struck, told them as exactly when it did not strike, by its being out of order. Montaigne tells us of some oxen that were employed in a machine for drawing water, who, after making three hundred turns, which was the usual number, could be stimulated by no whip or goad to proceed farther. Infants, also, cry for, and expect the breast, at those times in which the nurse has been accustomed to give it.

Hence it would appear, that the human œconomy is subject to periodical revolutions, and that these happen not oftner may be imputed to variety; and this seems to be the reason why they oftner happen in the body than mind, because that is subject to greater variety. We see frequent instances of this in diseases, and in their
crises;

crises; intermitting fevers, epilepsies, asthmas, &c. are examples of periodical affections: And that critical days are not so strongly marked in this country as in Greece, and some others, may be imputed to the variety and instability of our climate, but perhaps still more to the less sensibility and irritability of our system, for the exhibition of medicine has little effect in disturbing the crises, though it be commonly assigned as a cause.

We are likewise subject to many habits independent of ourselves, as from the revolutions of the celestial bodies, particularly the sun, which determines the day, perhaps, to other daily revolutions besides sleeping and waking. There are also certain habits depending on the seasons. Our connections, likewise, with respect to mankind, are means of inducing habits. Thus regularity from associating in business, induces regular habits both of mind and body.

There are many diseases, which, though they arose at first from particular causes, at last continue merely through custom, or habit. These are chiefly of the nervous system. We should, therefore, study to counteract such habits; and accordingly Hippocrates, among other things for the cure of epilepsy, orders an entire change of the manner of life. We likewise imitate this in the chincough, which often resists all remedies till the air, diet, and ordinary train of life are changed.

5.

Effects of Custom on the blood-vessels. From what has been said on the nervous power, the distribution of the fluids must necessarily be variously affected by Custom, and with that the distribution of the different excretions; for though we make an estimate of the proportion of the excretions to one another, according to the climate and seasons, they must certainly be very much varied by Custom.

On

On this head I may observe, that blood-letting has a manifest tendency to increase the quantity of the blood; and if this evacuation be repeated at stated times, such symptoms of repletion, and such motions are excited at these times, as render the operation necessary. The same has been observed in some spontaneous hæmorrhages. These, indeed, at first, may have some exciting causes, but afterwards they seem to depend chiefly on Custom. The best proof of this is with regard to the menstrual evacuation. There is certainly something originally in females, that determines that evacuation to monthly periods. Constant repetition of this, comes to fix it, independent of strong causes, either favouring or preventing repletion; *e.g.* blood-letting will not impede it, nor filling the body induce it: And, indeed, so much is this evacuation connected with periodical motions, that it is little in our power to produce any effect by medicines but at those particular times. Thus if we would relax the uterine system, and bring back this evacuation when suppressed, our attempts would be vain and fruitless, unless given at that time when the menses should have naturally returned.

M A T E R I A M E D I C A.

HAVING now considered the subject to be operated upon, *i. e.* so much of the animal œconomy as seems necessary for understanding the operation of medicine, we shall now proceed to treat of medicines themselves. I told you I proposed to range these according to the indications in which they are employed. However, the plan given you is not so perfect as I could wish. But in the course of my Lectures I shall observe its several errors and imperfections. These mistakes were unavoidable, considering the shortness of the time allowed to make out my catalogue, which is in most of your hands, and though not fit for the public eye, yet, with all its imperfections, I believe it may be to you of considerable use. Having distributed my medicines according to the several indications, I find myself necessitated to explain that *term*. An indication is the rule for changing
any

any disease into health. The remedies, by which these changes are produced, are called *indicata*, and the symptoms, which point out the changes to be produced, the *indicantia*. In distributing medicines according to the indications, they must be founded on a pathology, or doctrine of diseases. This I have done; but to shun disputes which are unavoidable on so dark a subject, I have rendered the division very *general*. I have, with the generality of authors, divided medicines into two classes, viz. those which act on the *solids*, and those which act on the *fluids*. Some have added a third class, viz. those which act on both solids and fluids. This I have not done, because it often happens that these actions are only *secondary*, proceeding from their action on the solids or fluids. There are, no doubt, medicines which act on *both* solids and fluids at the same time, as salts; but as no medicine whatever is perfectly *simple* in its operation, I chuse to class such medicines as seem *complex* in their operation, under that head to which their principal action belongs.

Thus far I have explained my general plan of indication. There may, indeed, be started some objections, *e. g.* It may be said, if evacuants, instead of acting on the *fluids*, as I have classed them in my table, produce their effect by operating on the *solids*; I admit the force of this objection, though it appears allowable to take the ultimate effect for the cause, and the more so as it is consonant to the usual systems. I have made two divisions of the medicines which act on the solids. The first comprehends those which act on the *simple* fibres, the second those which act on the *moving* fibres, or, as Gaubius calls them, *solida viva*. I have ranged the medicines which act on the *simple* solids according to the diseases to which *they* are liable. My indications here are taken from Boerhaave, who, in his chapter *de morbis fibræ debilis & laxæ*, begins with *nutrientia*, *i. e.* those substances which afford matter for nourishing the weakened fibres. This indication, indeed, is not *strictly* correct, for though in some measure it is applicable, yet it is not calculated to bring about *sudden* changes. I now proceed to explain those
technical

technical terms which I employ in order that my meaning may afterwards be understood. To begin, then.

By *nutrientia*, I mean every thing received by mankind as food. The second indication in laxity comprehends such medicines as increase the cohesion of the particles of the simple fibres, and so render them more dense. These we have distinguished by *astringentia*. This term has been used more loosely, for every thing that gives strength, and stops evacuations that are supposed to proceed from laxity. In the case of rigidity of the simple fibres, there are also two indications, *viz.* 1. To diminish the nutriment or application of new substance to the solid fibre; but of this afterward. The second that is mentioned in the table comprehends emollients, by which I understand such medicines as diminish the *cohesion* of the simple fibres.

We next speak of those medicines which act on the *solida viva*. The diseases of the moving fibres are very various, but taking a general view of them, we reduce them to three kinds; 1. Where contractility or motion are *diminished*. 2. Where they are too *strong*, or too much *increased*. 3. Where there is *irregularity* of motions. In the first case, the *stimulants* are indicated, *viz.* such medicines as excite more vigorous contractions. 2. Here are indicated the *sedativa*, by which term I mean those medicines, in whatever manner they act, which diminish too great contractility and motion. 3. In this case the *antispasmodica* are indicated, under which term, to avoid cavil, I mean such medicines as *compose*, or *take off*, irregular motions in our system.

Those medicines which act on the fluids, in compliance to general custom, I divide into *alterants* and *evacuants*. By the first, I mean medicines which produce changes in the *circulating* fluids, and are reckoned of two kinds, as they operate on the *mixture* or *consistence* of our fluids; though perhaps these cannot be separated, as we have already observed in the preliminary lectures. With regard to the

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consistence

consistence of our fluids, they may be too thick, (which property is called *lentor* and viscosity,) or too thin. Remedies for the first are called *attenuantia*, for the last *inspissantia*. As to mixture we are well acquainted with its variety only in *one* case, viz. *acrimony*. There may, indeed, be other faults, but these we neglect, as the doctrine of the fluids is very incomplete. Medicines adapted to acrimony are of two kinds. First, those for acrimony in general, the *demulcentia*. The second, are those suited to particular kinds of acrimony. Some have entered with great subtilty in their enquiries into the different kinds of acrimony, but it appears to me, that we are only well acquainted with two species, which are the source of the rest, viz. the *acid* and *alkaline*. Most part of what our own fluids are formed of, either are *originally* or have a *tendency* to become acid in the stomach, and, therefore, we may *suppose* an acid acrimony even sometimes to enter the system, and to prevail there. Medicines which correct this acrimony I have termed *antacid*. Again, it is found to be the constant effect of the animal œconomy to convert the acid into an opposite acrimony. Some affirm, that this is a perfect alkali, but all agree it is of alkalescent nature. The medicines against this acrimony I have named *antalkalina*. In the general indication for correcting acrimony, I might have made a division; first, into those medicines which correct, and, secondly, into those which obviate acrimony. Those that obviate the too great acrimonious alkalescency of our fluids I have set down under the title of *antiseptica*.

Having explained the different terms which occurred under the head of *alterantia*, we are now to consider those under *evacuantia*. By this term we understand those medicines which encrease the *excretion* of fluids to be thrown out of the body. There may, indeed, be remedies which encrease the internal *secretions*, but we are as yet unacquainted with them; *e. g.* we have no medicine which will purge the pancreas alone without affecting the intestinal glands. In this explanation I shall begin *a capite ad calcem*.
 1. *Errhina*, which encrease the mucus of the nose; 2. *Sialagoga*;
 these

these encrease the quantity of the *same mucus*, and also the saliva; in short, whatever is evacuated by the mouth and nearly contiguous fauces. 3. *Expectorantia*, those which encrease the *mucus by the bronchia*: I prefer this strict sense to the more general one of whatever is evacuated by the lungs. 4. *Emetica*, those which evacuate the stomach. We shall not enter nicely into what is to be evacuated; desiring it to be remembered, that we only mean by emetics whatever evacuates that which may be in the stomach. 5. *Cathartica*, those which in the same general way evacuate by stool. 6. *Diuretica*, those which encrease the evacuation of urine. 7. *Diaphoretica*, those which evacuate by the surface of the body, comprehending the insensible perspiration or more gross sweat. All these *excretions* depend on *secretion*. There is another evacuation in the human body which does not depend on *secretion*, viz. the menstrual flux in women. Medicines which promote this are called *menagoga*, which term is also applicable to the hæmorrhoids in men, and the lochiæ in women.

Besides the terms which I employ, you will find many more in the Writers on *Materia Medica*, which, though often used injudiciously, are nevertheless necessary to be understood. I shall here explain them, and begin with the terms synonymous to these I have used.

I. To *nutrientia* are the terms *restaurantia* and *analeptica*, for they are only a species of *nutrientia*. Writers have extended the meaning farther, and ranked under this head, many I comprehend under medicines: For if saleg, satyrion, &c. be restoratives, it is only so far as they are *nutritives*. *Linnaeus* names *analeptica* those medicines, *quæ vires instant*, or which quickly give a certain vigor to the system, as wine, &c. but these properly belong to the *stimulantia*.

II. *Adstringentia*. 1. *Exsiccantia*; this term should be confined to *external* medicines; for though laxity may depend upon moisture,

they can only act in external applications, for if there be such internal remedies they must act as astringents. 2. *Indurantia*: This is also a complex term, for they harden, by bringing the fibres closer together, and so are no other than astringents. 3. *Roborantia*: This is also a complex term, comprehending medicines of different classes, as *nutrientia*, &c. but in so far as these medicines act on the simple fibres, they are the same as *adstringentia*. 4. When our fibres are endued with a power necessary to perform the functions, they are said to be in tone; medicines, therefore, which promote this state are called *tonic*, but they act only as astringents. 5. *Sistentia*, or medicines which stop evacuations. These are commonly *astringent*: But this term ought to be rejected, as it leads to an ambiguity. Opium, *e. g.* is a powerful sistent, though it does not act by its astringent quality, but by taking off the sensibility of the fibres, and so diminishing their oscillations.

III. *Emollientia*. 1. *Laxantia*: This is synonymous to *emollientia*, and perhaps the properer of the two, were it not ambiguous, by its being applicable likewise to purgatives of a more gentle kind. 2. *Humectantia*: This term is also synonymous, comprehending such medicines as add moisture to the fibres which is perhaps the chief effect of emollients; but some extend the meaning of *humectantia* farther, to encrease the fluid part of the system in general.

IV. *Stimulantia*. 1. *Calefacientia*: As there is no way of increasing animal heat, but by increasing motion, all the medicines comprehended under this term are really stimulants. 2. *Attrahentia*: This term strictly means all those topical medicines that determine a greater flow of the humours externally; but these, in my opinion, are universally stimulants. The term *attrahentia* comprehends three subdivisions; first, such substances as increase the heat of the part; secondly, those which excite the heat with some degree of inflammation, called *rubefacientia*; thirdly, those which raise blisters, the *vesicantia*, and now frequently *epispastica*, though.

though this term more strictly implies *attrahentia*, and is synonymous to it.

V. *Sedativa*. I have formerly observed, that this is a complex indication : As the substances which diminish motion in the system are very various, hence the synonyms of *sedativa* must be so too ; e. g. *Antiphlogistic* is a term very generally used for substances which abate inflammation ; but, as these depend on an increased motion, in this sense the term is the same as *sedativa*. Antiphlogistics are also such medicines as relax the solids, destroy contractility, or attenuate the fluids ; but here the term, being too loose, ought to be rejected. 2. *Refrigerantia* : This term is more precise, meaning such substances as diminish the motion of a particular part, or of the system in general. I shall not here enquire into the manner in which these effects are produced. 3. *Anodyna* : This term strictly means medicines which ease pain. It would be difficult to determine whether there is an increased motion in every case of pain ; if so, which I think probable, all anodynes are sedatives. Whatever be in this, anodynes, I may say, act first either by diminishing the motion, or taking off the feeling of the pained part. Of late, anodyne has been confined to medicines which act in this last way, and therefore is commonly understood to be the same with *hypnotica*, or such substances as induce sleep, though it would be more proper to make a distinction. *Somnifera* and *soporifera* are the same as *hypnotica*, and all synonymous to *sedativa*. Lastly, *Paregorica*, which, by the ancient Physicians, were considered as *sedativa*, and the strict meaning of the term implies that sense.

VI. *Antispasmodica*. To this term, the only synonymous term I know, is *carminative*, which strictly implies such antispasmodics as have the power of taking off spasms depending on intercepted air in the intestines..

VII. *At-*

VII. *Attenuantia*. These act either, first, by increasing the quantity of our fluids, or, secondly, by diminishing the cohesion, the quantity continuing the same. 1. *Diluentia*: This term is synonymous to the first signification of *attenuantia*, and diluents only act in proportion to the quantity of water they contain, water being the only diluent: But writers on the *Materia Medica* often, improperly, use this term in the same general sense as *attenuantia*. 2. *Incidentia*: This is used in the second signification of *attenuantia*, and is thus called from a supposed theory, that such substances break down the fluids as with sharp edges or points. 3. *Resolventia* are properly such substances as give fluidity to portions of our fluids, that had been formerly concreted. Authors, however, use this term in the same general sense as *attenuantia*, and not without propriety, as the same medicines answer both intentions.

VIII. *Inspissantia*. 1. *Incrassantia*: This term is, perhaps, equally proper.

IX. *Demulcentia*. Such substances as cover and sheath acrimony, are called demulcents. 1. *Antacria*: *Materia Medica* writers use this term in the same sense as I do *demulcents*, but improperly, as this term may imply every medicine which destroys acrimony, as *antacida*, &c. and even those which obviate acrimony, as the *antiseptica*. 2. *Lenientia*: This has been used for *emollientia*, but it is properly synonymous to *demulcentia*. Other terms have been introduced from theories, *e. g.* Acrimony has been supposed to depend on angular pointed spiculæ, hence *obtundentia*, and *obvolvencia*, which mean such medicines as break off and sheath these spiculæ: But these terms should be avoided, as this theory is neither clear nor well founded. Again, it has been supposed that acrimony depends on the too great prevalency of any of the component parts of the blood, and those medicines which brought it back to its own natural state, which they supposed always to be bland, were called *temperantia*.

X. *Antacida*.

X. *Antacida*. Boerhaave has divided this class into *absorbentia* and *immutantia*; by the first, supposing such substances as took the acid into their pores without changing its nature; and by the last, those which did. But we now know that nothing absorbs an acid, without a *tertium quid* resulting. In the first intention, absorbent earths can only be used; in the last, alkaline salts.

XI. *Antalkalina*. This term has no synonyms.

XII. *Antiseptica*. I know no synonymous term to this but *condientia*, employed by De Gorter. By *antiseptics*, we mean such medicines as obviate the too great putrescency of our fluids; but *condientia* extends farther, implying such medicines as, without obviating any particular changes, keep the fluids in their present state. But the fluid circulating in our vessels being subject only to putrescency, I cannot suppose that any such medicines, of that kind, exist, except they are antiseptics.

XIII. *Errhina*. Synonymous to this term is *ptarmica* and *sternutatoria*.

XIV. *Sialagoga*. To this is synonymous the *αποφλεγματοζοία*, which is likewise synonymous to *errhina*. It is needless to insist more upon these terms, as they are plain from the very etymology; and, for the same reason, we shall pass over those that follow in the catalogue.

I shall next take notice of such terms as have been employed by other *Materia Medica* writers, and are vastly too complex to give a distinct idea of the indications they are intended to answer.

Many diseases have been supposed to proceed from obstruction, and so the cure of the diseases must be effected by removing that obstruction: Hence the terms *aperientia*, *deobstruentia*, *deoppilantia*. *Aperientia* has been used, in a more vague sense, for every medicine which, in whatever manner, dissolves obstruction; and also for
such

such as increase secretions, though no obstruction subsists. *Decoppiantia* has a more strict allusion to the nature of the obstruction, as when it proceeds from something stuffing up the vessels. But none of these terms convey any strict meaning, as they do not explain the manner of their action. The student, therefore, ought not to be satisfied, till he has carefully evolved them, and reduced the medicines, which have these terms applied to them, to their most simple action.

We now proceed to the terms employed in Chirurgical indications; and first, of those in cure of tumors. Here the first indication is to discuss or resolve; hence the terms *discutientia* and *resolventia*. Although I do not deny the ultimate effect of these, yet the terms are too complex, as comprehending medicines very various in their operations, as *emollientia*, *antispasmodica*, &c. *Reprimentia*, *repercussientia*, *repellentia*, are all supposed, by many, synonymous to *astringentia*, but they are too various in their operation to come under any one head; for though *sacch. saturni*, oak bark, and opium, be all repellents, yet their manner of operation is very different. When a tumor can neither be repelled nor discussed, our next indication is to attempt suppuration, which has given rise to the terms *suppurantia* and *maturantia*. These terms are too general, and we ought to consider in what manner they bring about their effects, whether by operating on the solids, or increasing the putrescency of the fluids, and then give them names according to their most simple operation.

Suppuration being brought on, our next intention is to produce, or continue, good pus: Hence the term *digestiva*, which is equally complex with the former, and therefore ought to be studiously evolved. Digestion often depends on keeping up a proper degree of inflammatory motion in the part, and frequently also on removing fungosities. *Detergentia*, *abstergentia*, *mundificantia*, *depurantia*, are synonymous terms. *Detergentia* and *abstergentia* have been transferred to internal remedies, and applied to such as have the power

power of washing off, or destroying viscidities adhering to the vessels, and carrying them off from the body; and therefore, in this sense, if there be any such, they are no other than *attenuantia*. *Depurantia* have been defined such medicines as cleanse the body, by promoting the excretion of the degenerated fluids; therefore, in this sense, they are synonymous to aperients and attenuants.

The next indication commonly laid down by Chirurgical Writers, in the case of ulcers, is to renew the substance, and they called medicines for this intention *sarcotica*. This indication is entirely imaginary, unless in so far as it is applied to medicines which remove obstacles to Nature's performing the operation, and therefore are nothing but detergents or abstergents. Another indication laid down by Surgeons, is to agglutinate or consolidate; hence *agglutinantia* and *consolidantia*, as though these medicines united the parts to which they are applied. But this indication is equally imaginary with the former, being entirely the work of nature; therefore bandages are the only applications which can assist here. These terms, *agglutinantia*, &c. have been transferred to remedies given internally, and are then called *vulneraria*. This indication is likewise entirely the work of nature, for I know no agglutinants, and only two medicines which promote suppuration, mercury and peruvian bark; and if writers on the *Materia Medica* do mean any thing by vulneraries, it is astringents, but they are unfitly called so, astringents being never proper, nor are they indeed ever employed in such cases, at least in this country, and if abroad, it is rather in compliance with a rotin practice, and to amuse the patient.

The last indication in the cure of ulcers is to *cicatrise*, or draw a skin on the part. The medicines supposed to answer this end are called *epulotics* and *cicatrizers*, but this is entirely an operation of nature, though *charpie**, or dry powders, may assist it.

I am to mention some terms arising from a supposed specific property in the medicines: These were supposed of two kinds; I. Such

* Dry lint.

as were specific to a certain part of the system ; II. To particular diseases. The first division has been carried to great excess, as there is scarce a part of the system which has not had a medicine adapted to it ; but at first sight this division must appear false, as there is no disease of any particular part that is not common to any other part of the system. I shall now mention the terms of this first division in my usual order, *a capite ad calcem*. 1. *Cephalics* : By these are meant such medicines as are suited to diseases of the head ; but these are very various, and often opposite in their nature. By this term writers generally mean certain substances, which, by an agreeable odour and fragrancy, were grateful to the nerves at their origin in the head. If this were the case, the term might be admitted : But I shall afterwards show, that little virtue depends on the odour ; and all those remarkable for their odour are stimulants. A term synonymous to cephalic, is, 2. *Nervous* ; but this is still more ambiguous and extensive in its signification, as comprehending medicines suited to all nervous diseases, *e. g.* stimulants, sedatives, antispasmodics. 3. *Ophthalmics* are medicines supposed to act specifically in diseases of the eyes ; but as medicines good for diseases of the eyes are also equally efficacious for the same disorders in any other part of the body, this term has no proper meaning. Some medicines, as *euphrasia*, have been extolled as specifics here, but I know they have no title to any pre-eminence. 4. *Pectorals, thoracics, pulmonics, pneumonics*, are all terms applied to medicines suited to diseases in the breast, but not one of them has a specific virtue ; for I imagine those medicines which increase the bronchial mucus will also promote the secretion of mucus in any other part of the body. But writers in general mean, by pectorals, all those medicines which promote or correct the bronchial mucus, two very opposite effects, and therefore the terms are confounding. 5. *Cardiacs*. Cordials act in general on the nervous system, and not specifically on the heart. 6. *Stomachics*. Many of these medicines excite appetite and promote digestion, but they are of such different kinds, and to be used in such different circumstances, that no such term ought to be admitted. With regard to the other abdominal viscera,

viscera, the terms are applied with even less propriety than in the former. 7. *Hepatic*. This term seems to have no meaning at all, as we cannot conceive any medicine has a specific operation on the liver preferable to any other part of the system. If any medicine more directly promoted secretion of bile, it might be called hepatic. Some such indeed have been supposed, but I am not acquainted with them. 8. *Splenetics*. This is still more improper than the former. 9. *Nephritics*. It is possible there may be medicines which act more directly on the kidneys, but it is only in so far as they are diuretics. Nephritics are appropriated to diseases of the kidneys, but they are here the same with demulcents, as they act by defending the kidney from the acrimony of the urine, and sharp points of the gravel. Nephritics have not only been supposed to act as diuretics, but also to push out, and even dissolve, sand or gravel; but we know none of this kind but such as are diuretics. 10. *Uterines*. This term is equally exceptionable with any of the former, for I doubt even if the *menagoga* act directly on the uterus. 11. *Aphrodisiaca*: The medicines which act on the genitals, and stimulate to venery. I imagine this also a false indication; for we know no medicines which do this by their immediate action on those organs. Cantharides have been supposed to be of this kind, but they act only by being received into the blood, and stimulating the bladder, and so communicating their effects to the organs of generation. There are other aphrodisiacs, which are supposed to increase the seminal turgescency; but these are imaginary, for we know none but nutrients, which, by being long detained in the system, distend all the vessels, and the seminal vesicles also. 12. *Antaphrodisiacs*. I can say, with more certainty, that this is an unmeaning indication.

II. We now come to consider specifics, with regard to particular diseases. Many, dissatisfied with the reasonings of dogmatic Physicians, have been led into pursuits of specifics: If this could be done with success it would certainly be very desirable; but at this day I know no medicine whose action I do not think I can explain by its

answering a particular indication, which entirely destroys the notions of a specific.

I shall content myself with barely enumerating, in our usual order, the terms of such supposed specifics, what we have already said superseding a farther explanation: *Anti epileptica, anti maniaca, anti melancholica, anti hypochondriaca, anti catarrhalia, anti phthifica, anti betica, anti cachectica, anti dysenterica, anti icterica, anti strumatica, anti scorbutica, anti podagrica, anti venerea, anti febrilia.*

We now proceed to another division of terms arising from superstition or false notions.

Anti magica, anti pharmaca, anti toxica, alexeteria, anti galactophora, anti lactifera, or lactifuga, ebolica, aristolochia, abortiva, lithontriptica, catagmatica. I have put *lithontriptica* in this catalogue, though I allow there are some medicines which deserve that name, as *aq. calcis* and alkaline salts; but these have been but lately found out, and as the term is used in the *Materia Medica* Writers, it is improperly applied.

Thus far have I thought proper to treat of terms, in order to assist your understanding of different Authors, and to guard you against their ambiguous and inaccurate expressions.

Before proceeding to our immediate business, we shall mention two indications omitted in the catalogue; the first, *erodentia*, or medicines which destroy the simple fibres; secondly, *anthelmintica*: This indication is a proper one, as there are medicines which act specifically on worms, but it could not be introduced into my plan.

NUTRI-

N U T R I E N T I A.

Perhaps the whole of our subject might be divided into *food* and *medicine*. The first is implied by the term *nutrientia*, which comprehends every thing used by mankind in their daily food, as well the substances which are strictly nutrient, as those which are employed to *obviate* and *correct* the degeneracy to which the nourishment is liable. But more strictly *nutrientia* are such substances as are fitted by the vital power to be converted into our fluids and solids, in order to sustain their growth and repair their daily waste. Here a question arises, whether our solids and fluids are formed from one common aliment, or out of a mixed, *i. e.* one containing a principle of nourishment suited to each. The first opinion appears to me the most probable.

All aliment differs in two particulars; first, as it is already assimilated into the animal nature, or requires to be *converted* into it, by a particular process of the animal œconomy. Of the first kind are all *animal substances*, which, if not similar, are nearly so to our nature, and require only for that assimilation *solution* and *mixture*. The second kind comprehends *vegetables*, which must undergo several changes before they can be assimilated. But as the nourishment of all animals, even of those who live on other animals, can originally be traced to the vegetable kingdom, it is plain that the principle of all nourishment is in vegetables, and that, therefore, we ought to begin with these.

V E G E T A B L E A L I M E N T.

The first question that arises here is, What are the vegetables which are peculiarly appropriated for food? Perhaps there is no vegetable but what affords aliment to some animal. But I will venture to say, that in human aliment a choice is necessary, and a distinction ought to be made. The first distinction is, that those vegetables which are of a mild, bland, agreeable taste, are proper
nourishment;

LECTURES ON THE

nourishment; while those of an acrid, bitter, nauseous nature are improper. Every body, *en gros*, will allow the truth of this. There are, however, several *acrid* substances that we use as food, but the mild, the bland, the agreeable, are in the largest proportion in every vegetable; whereas the acrid, the bitter, the disagreeable enter in the least quantity; which last, however, may prove nourishment, provided our system is capable of *subduing* their nature. Thus we see that some animals live on what is poisonous to others, which seems entirely owing to the particular *conformation* of these animals. Of all these animals the human body is most delicate in the choice of its food, and the acrid, bitter, and disagreeable can never be admitted as aliment. There, however, seem some exceptions. Thus *celeri* and *endive* are used in common food, both substances of considerable acrimony; but you must observe, that when we use them, they are previously blanched, which almost entirely deprives them of that suspicious tendency. Or if we employ other acrid substances, we generally, in great measure, deprive them of their *acrimony* by boiling. In different countries the same plants grow with different degrees of acrimony. Thus garlic here seldom enters our food; but in the southern countries, where they grow more mild, they are frequently used for that purpose. Again, the plant which furnishes *cassada*, being very acrimonious, and even poisonous in its recent state, affords an instance of the necessity of preparation of acrid substances even in these countries; for by a particular management they allow the acrimonious juice to run off, and the farinaceous nutritious part of it is left behind. Upon the whole, therefore, I maintain, that we use no acrid substances in our food that are not previously deprived of their acrimony; or, if we do, they are only employed as *condimenta*. But if the question still remain, if it is still urged, that acrid substances *are* employed in our food, I alledge they are only such as the human body, by its particular *conformation*, is capable to subdue. Here then begins the division of plants into food and medicine, the mild, the bland, the agreeable plants, or their parts, being fit for food; while the acrid, &c. are proper for medicine.

medicine. For this reason Linnæus's aphorisms are well founded, *insipida & inodora nutriunt, sapidiora non nutriunt*. The reason is very obvious, for unless substances *affect remarkably* our organs of sense, they cannot be supposed to operate powerfully on our system. And this very effect of operating powerfully on our system, destroys their *expediency* as food. Again, as sapid and odorous substances have the power of operating changes in our system, they must act on the *nervous power*, the part chiefly changeable. The insipid and bland do, indeed, act on our fluids, but the changes they produce must be very *slow*.

We shall now enquire what part of the mild and bland substances constitutes the *proper* aliment. In general, the more sweet substances are all nutritious: These are little known here as food, but in the warmer climates make the greatest part of it. We have now facts to prove, that sugar alone is nutritious, and we shall afterwards endeavour to prove, that all fruits we use are nutritious *only from their sugar*. Here, the farinaceous substances are more evidently nutritious, as likewise the bland mucilaginous. These two are nearly connected with each other, and both with the *saccharine* substance; for all farinaceous substances, before maturity, are sweet, and, after maturity, can be restored to their sweet state by malting. Again, in fruits we observe a change from sweet to farinaceous, which last property many of them attain upon maturity; and all farinaceous substances, when mature, abound in oil; so that it appears that the saccharine and oily part, blended together, make the mucilaginous and farinaceous matters, *i. e.* the intermediate states between sugar and oil; so that I conclude, that sugar and oil blended together, and forming the farinaceous substance, is the nutritious part of vegetables. You will now see what I formerly asserted, that either oil may enter into the nutritious substance, or that the nutritious substance, by animal process, may afford oil.

We are next to consider on what the difference of nutritious substances depend. This turns on two heads; 1. On the quantity of nutriment.

nutriment each substance contains; 2. On its being more or less easily assimilated.

I.

This depends on two circumstances; 1. On their containing the proportion of sugar, or oil, or both; and that proportion even being given, it may depend also on the *texture* of the subject, which allows a quantity of nourishment more or less easily to be extracted from it. Thus, *e. g.* if my stomach extract from a plant, which contains a less proportion of nourishment than another, that nourishment more *easily*, it will compensate for the quantity. As to the difference, with regard to the quantity of nourishment *each subject affords*, we defer that till we come to treat of each in particular.

2.

As to more or less easy assimilation. This difference arises not only from *quality* of the substance taken in, but also as often from its *relation* to the stomach, or state of the animal organs. Nothing is more common, or more ridiculous, than to ask whether this or that substance be wholesome. As to the quantity, indeed, the answer might be easy; but as to quality it entirely depends on peculiarity of constitution. The changes our aliments undergo, are of three kinds; 1. In respect of assimilation; 2. of solution; 3. mixture.

1. Assimilation implies a change of the nature of the subject, which spontaneously is inclined to alterations, different from those intended to be wrought by the assimilatory process; *e. g.* all vegetables are spontaneously acescent, and as there is nothing of that beyond the *primæ viæ*, it is necessary, therefore, that it should be overcome. Against this it may be objected, that vegetables are both acescent and alkalescent; but I am ready to prove them all of the first nature. Do vegetables then become acid previous to their undergoing any other change? I confess this is my opinion, though it is not the common one. For it is supposed, *e. g.* that
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in the stomach of a strong healthy man the food becoming acid, tends directly to the putrefactive fermentation. The arguments adduced in favour of this opinion are, 1. That an acid fermentation cannot be carried on without a considerable admission of air, and that the stomach, being a *close vessel*, excludes the access of that fluid; 2. That the heat of the stomach is too *great* for the acetous process; and, 3. That the admixture of the spontaneously putrescent animal fluids would besides *obviate* this acescency.

As to the first objection, the stomach is not the close vessel alledged, for it admits a large quantity of *air* along with the food, &c. Secondly, I have found, by accurate experiments, that the acetous fermentation can be carried on in a heat equal to that of the human body, I believe even it is not free of the vinous; although I confess that it will be *difficult* to conduct the process in such degree of heat, yet it may be done, and indeed it always does take place, although *rapidly*, and soon terminating in the acetous process. Third, as to this objection, Dr. Pringle, I think, has sufficiently proved, that the admixture of animal fluids cannot hinder the acetous process, but, on the contrary, that in certain proportion they promote it. None of these three circumstances, therefore, are sufficient to prevent the spontaneous tendency of the vegetable aliment to acidity; and I am certain, from experiments, that the vegetable aliment first turns acid in the stomach; for every stomach, human or brute, is always, on examination, found to have an acid present in it. Hence that acescency is not a disease, but a step towards assimilation: And if Physicians observe diseases proceeding from this cause, they ought to be attributed to the *state* and *degree* of it. As to the state or condition of it I think, it is this: Whenever the aliment enters into a high vinous fermentation, with copious generation of fixed air, commonly called *gas silvestre*, as of the same nature with that produced in the ordinary vinous process, it becomes a *disease*, and has the power of destroying the *mobility* and *contractility* of the moving fibres, and even the tone of the stomach itself, producing there flatulency and spasm from irregular

gular motions of the nervous power, and, at last, stupor, lethargy, apoplexy, and death. This happens chiefly from fault of animal organs; for though it appears, by Pringle's experiments, that animal fluids do not prevent fermentation, yet they have the power in their sound state of moderating the *generation of air*.

When acidity is a disease, it always depends on the above, and on the *degree* or quantity of it; for although I have said that acidity is necessary, yet it should only be of such a degree as afterwards to be overcome by the mixture of the animal fluids. I have yet only mentioned the *organs* as the cause of acidity; but it also depends on the *quantity* of acid naturally in the vegetable, and its tendency to undergo the vinous fermentation. For the disease consists not so much in acidity as in the *vinous* fermentation. For if we take in vegetable matters, after having undergone the vinous fermentation, their effects are not so much to produce flatulency, but depend on the quantity of acid taken in. Hence farinaceous substances, naturally aced, when leavened, *impede*, though not *prevent*, the generation of flatulencies; and hence the same quantity of *vinegar* does not produce equally bad effects, as of vegetable unfermented juices.

Acidity, as a disease, depends on the aliment; 1. As it contains a large proportion of saccharine matter. 2. When to that is joined a fresh acidity, which renders it more liable to ferment. Instances of this in the *fructus acido dulces*. 3. When, by a *previous* accident, it is put into a state of active vinous fermentation, and in its fermenting state is taken into the stomach, as new wines, ales, &c. These are the *qualities* that are apt to be most hurtful in their consequences. On the contrary, those substances which have undergone fermentation, are less liable to produce bad effects, and only do so from their quantity.

In the next place, this morbid tendency in the aliment depends on the state of the body, and chiefly on a weaker action of the stomach

stomach (for I pass over the effects of the gastric liquors, as we are yet but little acquainted with them, and as these effects depend on the state of the stomach.) To the more or less brisk action of the stomach, may likewise be referred the greater or less quantity of nutritious juice emulged, or squeezed out; and also in proportion to the weaker state of the stomach, the food is longer retained there.

These are the circumstances which should be in view, with regard to aliments, in different persons.

When the aliment is pushed into the *intestines*, its acescency is more certainly overcome by the addition of the bile, and a supply of pancreatic and intestinal fluids, analogous to the *saliva* and gastric liquor; and as the aliment never *rests* in the intestines, it is always exposed to mixture of new juices. Effects of the bile on the aliment are as yet little known. Vegetable acids change the bile in colour, consistence, and taste, which last is sweet, and this mixture probably affords a new stimulus when the *acidity* prevails; and in this way our vegetable aliment *stimulates* the intestines, produces purging, and even a greater discharge of choler itself.

It has been imagined by Physicians, that aliments differ in their *effects* on the bile, some *increasing* its acrimony, &c. but what they have said seems to me loose and inaccurate. Whether there are substances which have different properties with regard to the bile, I dare not determine, and I think whatever is said by authors on this subject may be reduced to the greater or less acidity of the aliment.

2. This is all that is necessary to be said with regard to the assimilation of the aliment; we are next to treat of its *solubility*. Solubility always depends on the *more or less firm texture* of the subject. We are apt to mistake on this head; for animal substances, though seemingly of more cohesion, are found, by a weight appended, to be of easier solubility. Solubility, then, is more to be noted in vegetables than animals; thus the husks of vegetables are of much

more difficult solubility than animal substances of apparently the same cohesion. In general, the soft, pulpy, &c. vegetable substances are easily soluble, and the tough, &c. the contrary, and these are also the longer retained in the stomach. Almost all vegetable substances employed in diet are specifically lighter than water, and consequently than the gastric fluids; hence they will float near the cardia, and cause eructations. For some hours these former substances give no uneasiness, but afterwards begin to operate on the upper orifice of the stomach. 2. The solubility of our aliment is diversified according to firmness of texture; for, in proportion to the solubility, two substances, containing equal quantity of nourishment, give more or less of it to the extracting powers, and in proportion to the quantity of nourishment extracted, more or less faeces are left. Vegetable aliments, *cæteris paribus*, give more faeces.

3. With regard to the *mixture* of the aliment. Whenever the oil and watery parts of our aliment are *naturally* mixed, the stomach does little. But commonly this is not the case, and the oil and water separate in the stomach, and must be at least in that viscus intimately confounded. This previous mixture need little to be regarded in strong stomachs, but in weak ones; in this case the oil and water separate, the former floating near the upper orifice, and causing uneasy symptoms. I have known many persons whose eructations were purely oily, and would flame in the fire, and, indeed, this is the strongest proof of a weak stomach. Oil is liable to particular changes: Out of the body it checks fermentation, but is apt in weak stomachs to turn rancid, and occasion heart-burn, a disease more frequent from this than any other cause. Not only is the aliment thus diversified, but the qualities of the food also often depend on peculiar sensibility of the stomach, or idiosyncrasy, which here oftener occur than in any other part of the system. *e. g.* With respect to honey, though, indeed, I think, some reason may be given for this, such persons being often affected with it who are affected with acidity, as honey consists of acid and sugar, the matter of fermentation. This seems to be confirmed by such persons eating
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it with impunity, when new, mixed with the comb, or when, by boiling, its air is diffipated, and its acid more intimately mixed with the saccharine part. I am not certain whether this theory be sound, but though it *be*, it cannot extend to spasmodic symptoms, &c. produced by a small bit of egg, crab, &c. which symptoms can only be explained from idiosyncrasy. These extraordinary instances lead me to suspect the sensibility of the stomach extends further than is suspected; and may be reckoned the cause of different tastes, &c. The primary cause of the stomach's sensibility seems to be, that it may extend this sensibility over the system.

That the stomach is sensible to different degrees of solubility and mixture, is evident from what has been already said. Thus, a quantity of warm water and oil is almost always thrown up. A small quantity of oil itself will produce this effect. The different sensibility of the stomach will determine the stay of the food in that organ. Hence peculiar flavours affect this longer or shorter stay. To all these I have to add a peculiar effect of the sensibility of the stomach, viz. whenever the stomach is employed in digesting the aliment, it seems to be an established law of the animal œconomy, that there is more or less fever excited during the time of digestion, necessary, indeed, in some degree, but when it proceeds to a *noxious* one it ought to determine a change of our aliment. These preliminaries being settled, I proceed to talk of particular substances.

With regard to the vegetable aliments, I have thrown them into three divisions. The first comprehends all the different kinds of *nutriment*; the second the *drinks*; the third the *condiments*. Again, I have divided the foods according to the *quantity* of nutriment they afford, setting them in the following order, viz. fruits, herbs, roots, seeds; thus giving the least nourishing first, &c. This, however, is not strictly true, as some fruits are more nourishing than certain herbs, or perhaps roots, &c. but these exceptions shall be marked as we go along. Fruits are subdivided into those we eat *fresh*, or those we eat *dry*, or more concentrated. With regard to
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the *whole*, I have not pretended to enumerate *all* the different kinds of aliment, as they differ in different countries; and as of many of them I have little or no experience: I shall, therefore, confine myself to those known in this *country*, and from what application may be made to such as occur elsewhere.

In the Catalogue, several blank spaces are left, which shews that all those which stand *near each other* are of similar virtues and qualities, and differ more or less from those which are *separated* from them. Among the vegetables these blank spaces indicate a natural order among the Botanists, which also points out somewhat of resemblance in virtue of substances thus ranked together. The letters *a, b, c, d, &c.* signify that somewhat of a general title might have been inserted; *e. g.* at (*a*) *fructus acido dulces*, (*b*) *cucurbitacei*, (*c*) *herbæ esculentæ*.

As to the first head, comprehending the *fructus acido dulces*; they are divided into *recent* and *dried*. Of these the first division constitutes a natural order, called by Linnæus *Drupaceæ*, or the stone fruits. The virtues of these, and all other recent fruits, depend on four qualities, *acerbity*, *acidity*, *sweetness*, and *difference of texture*. By *acerbity* I mean acidity joined to *austerity*, or *stypticity*; acidity and sweetness are simple qualities, though sometimes joined, as in the *acido dulces*. These different qualities appear in the same fruit, according to the progress of maturation.

First ACERBITY appears, then more pure *acidity*, and lastly, *sweetness*. In so far as fruits are acerb, they should be rejected from our aliment into the class of medicines, where we shall speak of them under *astringentia*. We ought to observe here, however, that acerb fruits are less liable to an active fermentation, and have, in some measure, the effects of acids in stimulating the stomach and encreasing appetite. Being of firmer texture they are of less easy solution, apt to be retained longer in the stomach, and, though less acid themselves, are more apt to generate a noxious one. They
have

have the cooling virtues of acids, but are more to be taken notice of for their astringency, by both which qualities they diminish the peristaltic motion of the intestines, retard the passage of the aliment, and occasion an accumulation and retention of hardened faeces.

2. ACIDITY. In moderate degree acids are grateful to the stomach, and excite appetite. Directly as acid they are refrigerant, *i. e.* they weaken the active power of the animal fibres. This is not inconsistent with stimulating, which afterwards I shall shew is often combined with a refrigerant power in one and the same subject. Again, by weakening the stomach, they weaken the whole system. The acid of vegetables is never pure, but commonly joined with a sweet, and therefore in stomachs so disposed, is apt to produce there an active noxious fermentation.

3. SWEETNESS. This is the only nutritious quality of vegetables, and as such is perfectly innocent, but is liable also to bad effects from *spontaneous* changes, which depend on its *accompanying acid*, and the *weakness* of the animal organs. All these have, in the intestines, a purgative quality, from the changes they produce on the bile, acerbity as *acid*, and sweetness as *changed* into an acid.

4. TEXTURE. As of more aqueous and tender consistence they are more readily dissolved, and hence, perhaps, are more liable to fermentation. If of a very compact texture, by staying longer in the stomach, they, however, are apt to generate a stronger acid.

These are the qualities of fruits; and one may judge from the taste what nature they will be of, the state of the stomach being known. Let us then apply these general principles to the stone fruits. These are of a soft lax texture, and their juices dilute, by which means they are easily dissolved in the stomach, and for this reason they are apt to be taken in large quantities: As they are
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acido dulces, they are apt to ferment, perhaps more so than any others, from the quantity swallowed; hence they produce a copious acid, which irritating the intestines, causes diarrhœas and cholera, taking their rise more frequently from this than any other cause. Upon the whole, I endeavour to assign virtues in general, and I beg it may always be noticed, I except particular virtues: Thus there are plumbs of firmer texture, and therefore as little liable to ferment as firmer fruits.

Of the four following kinds of fruits, the PLUMB is most refrigerant, and liable to ferment and produce *cholera*, *diarrhœa*, &c. The CHERRIES are commonly imagined less noxious, but to me there seems little difference. The APRICOT is a sweeter, richer, and less noxious fruit. As to the PEACH, I have less experience: In those countries where it comes to full maturity, it may be safe, on account of the *richness* of its juice; but with us, its juice is poor, crude, and watery, its taste acid, and almost acerb, its consistence lax. Here, in general, we may observe, that the later fruit is always the richest.

The ancients alledged, that the stone fruits were disposed to produce fevers, an effect seemingly opposite to their qualities. This they do by their refrigerating power, and preventing digestion; and, perhaps, in those countries, may be the primary exciting cause. It is imaginary, that stones of fruits, swallowed with them, prevent their bad effects, and may sometimes be noxious, as they have been the foundation of stony concretions, especially if swallowed unripe, with an acerb crust adhering to them; besides, this should not be confined to cherries, and, were it true, would extend to the other stone fruits. Although I have mentioned only a few stone fruits, *viz.* such as occur here, they are, if found elsewhere, of nearly the same qualities, and to be presumed of much the same virtues.

The next set of fruits in the catalogue are APPLES and PEARS, the *Pomaceæ* of Linnæus. These have the common properties of the other fruits, *viz.* being liable to acerbity, acidity, &c. They are less

less dilute than the stone fruit, have a less active acid, and so are less liable to a noxious fermentation; but being of firmer texture, are longer detained in the stomach, and so produce a noxious acid. Apples are, in general, of a more firm texture, and less soluble than pears: Some pears, indeed, are firmer than apples, but commonly, when ripe, are more pulpy. The pear also is specifically heavier than water, and therefore, sinking to the bottom of the stomach, will be more subjected to the peristaltic motion, and sooner digested; while apples, swimming near the top, elude the action, and also, by irritating the cardia, produce uneasy symptoms. Again, *pears* have more of sweetness than apples, on account of which they are more nourishing, and, from the conjoined acerbity, are less liable to active fermentation. Writers on the *Materia Medica* have ascribed, without foundation, cardiac and pectoral virtues to these fruits.

I had an idea of arranging here a natural order, called by Linnæus *Hesperideæ*, which takes in more than are here mentioned; but their acid is so pure that they ought to be considered as *condimenta*. I have set down only the China oranges, which, from their sweetness, are certainly nutritive, but from their acidity they are subject to fermentation, and have, besides, the other qualities of stone fruits.

The next mentioned are STRAWBERRIES and RASBERRIES, belonging to the *Senticosæ* of Linnæus. These are very tender, and therefore easily dissolved, passing off before a very active fermentation can take place, which likewise is prevented by their *sweetness*, which is greater than in stone fruits; on all which accounts they are very innocent.

In classing all substances, after giving those which belong to a natural order, I throw together the miscellaneous by themselves, as here; the grapes, currants, gooseberries.

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CURRANTS.

CURRENTS, with us, may be always considered as an acid fruit, considerably dilute and very pulpy, when kept clear of the acerb husk ; they have very little sweetness, very little nourishment, and are liable to all the bad qualities of stone fruits.

GOOSEBERRIES are much sweeter, more nourishing, and more innocent, and without the husks are very easily dissolved, and readily evacuated, and, on account of their sweetness, are less subject to active fermentation.

GRAPES are a richer fruit, and preferred for the making of wines, as they contain a great quantity of saccharine matter ; on which account they also are more nutritive than any we have mentioned, perhaps as much as the *dates* and figs afterwards to be taken notice of. In the unripe state they are acerb, in their middle state they are apt to ferment, when perfectly ripe, and taken in a moderate quantity, they are among the innocent fruits.

I shall conclude what I have to say on the recent fruits, with some observations of the different method of using them. We have already observed their effects when used fresh. Wherever we employ heat we change their qualities, dissipate their active acid, and dispose them less to ferment. Thus acerb fruits, by the dissipation of their acid by boiling, &c. are rendered more so, and consequently not so liable to a noxious disposition : Hence universally, roasted or boiled fruits are safer than fresh. We commonly also join them with matters which dispose them less to an active fermentation. Thus milk, or, more properly, cream is often used, having that effect from its oily nature. We shall afterwards see what effect acids have in coagulating the milk. We also now commonly use aromatics, as pepper, which, by stimulating and invigorating the stomach, by taking off spasms, excited from *gas sylvestre*, and by their antiseptic virtue, enable them to resist fermentation, and prevent their bad effects. Wine is used to obviate the bad effects of fruit, but this depends on its spirituous part, and therefore pure spirit, were it not otherwise

otherwise noxious, would be most eligible. If wine be used it should be strong, and such as has undergone its fermentation, and is ripe and mellow. Another method still of using them is with sugar. This surely renders fruit more nutritive; whether it prevents fermentation may be doubted; but, as I have observed, that sweet fruits are safest, so must a moderate addition of sugar to acid fruits; in order to supply their want of native sweet, sometimes we use oily matters, as butter in apple pie. This is a very proper, though less usual addition, from its antifermentative quality. But in a weak stomach, where the inquiline humours are in less quantity, and less saponaceous, the oil is apt to separate, and produce ill consequences, as heart-burn, &c. as we have formerly observed.

It has been a question agitated among Physicians, whether fruits are safer before or after meals. The answer of this seems to depend on a knowledge of the stomach. In a weak stomach they are more apt to be noxious when empty, than when distended with animal food. Here likewise they cannot be taken in such quantity as to hurt. In strong stomachs there is little difference; there they would seem to promote appetite. In weak stomachs, even when full, if taken in too great quantity, they may be very hurtful, by encreasing the active fermentation of the whole. The ancients alledged, that the mild fruits should be taken before, and the acerb after meals, as being fitter to brace up the stomach, and promote digestion. And, indeed, if taken in moderate quantity, the rule may hold true.

Upon the whole, if you observe the effect of the four qualities, acerbity, &c. you are then in a condition to judge of these and any other wherever they occur.

D R Y F R U I T S.

None are fit, or indeed are subjected to this process, except those which abound, in their recent state, with much saccharine juice. It is true, that fruits of every kind are preserved, but this is more

for elegance than as a part of food ; any of the dried fruits I am to mention, are only such as are nutritive. I have said that sugar itself was nutritive ; nay, indeed, the very principle of nourishment, of which we have various proofs : Thus the Negroes employed in the sugar manufacture live almost solely on this, and fatten exceedingly. Another chief proof is, from the fruits which I am to speak of, which are remarkably fattening, but chiefly in their dried state. Again, birds, in fruit time, when the fruits are ripe, increase in fatness ; and at such time, Dr. Robinson has observed, that their livers are enlarged ; whence we see how fat people are so much subject to diseases of the viscera, especially the liver.

The dried fruits I am to treat of, are the grape, date, and fig. They have the common properties of ripe fresh fruits, but are not joined with so powerful an acid, part of it being dissipated in drying. Hence they are less liable to run into active fermentation ; but if taken in too great quantities, they will run into that, and the acid produced will have all the bad effects of fresh fruits, in producing *diarrhææ*, *cholera*, &c.

DRIED GRAPES, RAISINS, CURRANTS.

Of this are two kinds, the *uvæ passæ majores*, or raisin, and the *uvæ passæ minores*, or *corinthiææ*, or currants ; these last have more acid joined to their sugar, hence more laxative. I do not doubt but sugar itself may stimulate the intestines, and be a gentle laxative, but its stronger effects in purging are to be deduced, from its conversion into an acid. Hence currants are more purgative than raisins, and those than figs, on account of their acidity ; and for this reason prunes and currants are nearly similar in their effects. The raisins will also have more or less of these virtues, in proportion to the quantity of acid they contain.

D A T E.

This fruit is now less generally known here, but is the common food of a great part of Asia. Were I to give a botanical
account

account of any production, it would be this, as the palm-tree, whence it is produced, is so curious in its vegetation, and so extensively useful in life; but as I have nothing now to offer on this subject, I shall omit it, referring you to books where such disquisitions are particularly treated. The date is of different kinds: In their best state they are a pure saccharine fruit, free from acidity, but with considerable acerbity. Formerly they were much employed in medicine, but are now justly laid aside for those fruits which contain all their qualities in a greater degree, *viz.*

F I G S.

These are the most nourishing of the dried fruits; they contain a large portion of saccharine matter, united with mucilage. From their containing much sugar, and from being viscid and less readily perspired, they are more fit for nourishment. They are also, from their sugar and mucilage, used as demulcent, as their juice is most fit for covering acrimony. The date and raisin were formerly used in this intention: The first is now laid aside, but we retain the raisin as giving a grateful acidity to the too luscious taste of the fig. The fig is also nephritic from its demulcent quality. They have been said to produce lice, but there is no foundation for believing this, either from information, or from our experience of them in this country. It is true, that in their native country they make the chief food of the poorest people, who are generally dirty, and this may have given rise to the opinion.

The next class we are to mention is the *cucurbitaceæ*, of which many more are used in food than those here mentioned, *viz.* cucumber, melon, and pompion, which are chiefly used here.

C U C U M B E R.

This is taken in great cities by the lower people as nourishment, but by the better sort is chiefly employed as a refrigerant, or condiment, to accompany animal food. They have a bland insipid juice,
without

without acidity or sweetness, approaching, as appears by their ripening, to a farinaceous matter. When used green they have no nourishment, so are they only to be used in the summer season and by the sedentary. Although cucumber is neither sweet nor acid, yet it is considerably acescent, and so produces flatulency, *cholera*, *diarrhæa*, &c. I apply all these to their acescent nature, though indeed its coldness and flatulency may be increased by the firmness of their texture. I have seen them discharged with little change from the stomach, after being detained there for forty-eight hours. By this means, therefore, their acidity is greatly increased. Hence oil and pepper, the condiments commonly employed, are very useful to check their fermentation. We have lately used another condiment, viz. the skin, which is bitter, and may, therefore, supply the place of aromatics. But let me observe, that the *cucurbitaceæ* have, many of them, a very acrid juice in their skin; e. g. the colocynth, which is of this kind, into a bitter of which nature it is alledged that the cucumber, by particular management may be converted. Hence it would appear, that, as the bitter in the skin of cucumbers is of this kind, it should, therefore, only be used when young.

M E L O N S.

These have the same qualities we were just now mentioning, but being of a tenderer texture, they are, on this account, less hurtful, and, as accompanied with sugar, are consequently more easily digested from its bringing on sooner a fermentation to hasten their solution. All our watery vegetables may be considered as diuretics. Cucumbers and melons have been reckoned remarkably, so much as to bring on bloody urine. But this seems to be without foundation. To me, indeed, they would rather appear to have a contrary effect, by increasing the watery part of the urine.

P O M P I O N S

Are only used when boiled, and therefore are more safe, as their texture is much loosened; but at best they are a weak, insipid food,

food, except from the dressing, and therefore are now neglected. It tends to show their nature, that when well ripened, or when kept long after being cut from the stalks, they become mealy and farinaceous, and therefore more nourishing, and likewise safer with respect to the effects I spoke of.

We now come to the *Herbæ esculentæ*. (c.) *Olera* has been used for every thing put into the pot. Linnæus has confined the term *oleraceæ* to a particular order of plants, to which the three first in the catalogue belong orache, beet, and spinage.

O R A C H E.

This is of the coarsest texture of the three, insomuch as to be now hardly known in our gardens.

B E E T and S P I N A C H.

Beet is more tender, but less so than *spinach*, to which both this and the former have almost entirely given place. They are all of a watery, insipid taste, with little saccharine or mucilaginous quality, and therefore are of weak nutriment. On account of their little acidity and loose texture they are less flatulent than some of the other *olera*. They are said to be laxative, but as they have little acidity or sweetness, this quality cannot be remarkable. They are, however, acescent, and hence, if taken in considerable quantity, may prove so.

Nothing is more common than the opinion that all these *olera* are of a nitrous quality. This was Dioscorides's opinion, and he has been followed in it by almost every succeeding Author. But from a strict examination of their essential salts, I have found no foundation for such an opinion. The effects of all the *olera*, as laxatives, are very dubious. In weak stomachs they rather encrease costiveness, having nothing in them to stimulate the intestines and encrease the peristaltic motion. They are, indeed, the most cooling and least irritating of the aliments. What I have said of the beet be-
longs

longs entirely to the herb, for the root is very sweet, and, according to Margraaf's experiments, contains a larger proportion of sugar than any other root he examined. But the nature of this will be better understood when we come to speak of roots.

Nasturtium: These belong to an order of plants much used in food. Their general character is, that they are remarkably acrid, but not poisonous; on the contrary, their acrimony is of considerable use in medicine, and in their bland state, being deprived of this acrimony in boiling, they are used in food. Hence I took the general rule, that all our aliment is remarkably bland, and that the acrimonious part has little share in it: Of these we only use the *brassica* and turnep as food, the others only as condiment. *Brassica* is most frequent in use, and of this there are many varieties, as colewort, cauliflower, brocoli, &c. All these are sensibly sweet, and therefore more nutritious than most of the herbaceous kind. The distinction we make of them depends mostly on their texture. Formerly we only employed the colewort, which has given place to the more tender savoy; and perhaps this last will give way to the still tenderer cauliflower. Those of the *brassica* kind are more flatulent than the *oleraceæ*, as having more of a saccharine quality, which enables them to ferment, and, by this means, to produce an acid in the stomach. I believe they produce these effects in a milder degree, in proportion to the richness of their sweet, and tenderness of texture. On this account cabbage is rendered more flatulent, and hence a confirmation of the general rule, that flatulency is most owing to firmness of texture: Thus cabbage itself, when very young, is tenderer, and less flatulent, than when full grown.

N A S T U R T I U M

Is used merely as a condiment. Were it not of scanty growth, it might enter into our food, for I know that, by boiling, it is deprived of its acrimony, and affords an agreeable green.

L A C-

L A C T U C A A G N I N A.

This is a species of valerian: It is an insipid plant, perhaps from its being early taken up in the spring; for in its more advanced state it is somewhat bitter, and then approaches, in some degree, to the four following. In general, all early plants are either insipid or remarkably acrid: *Lactuca*, as we use it, has the general qualities of the oleraceous plants.

CICHOREUM, DENS LEONIS, ENDIVIA, LACTUCA.

These belong to the *semi flosculosæ*, or *plano petalæ*. They will afterwards be mentioned as medicines, under the subdivision of *amaro frigida*. These are all lactescent plants, and it is almost an universal rule, that all those which afford a milky juice are remarkably acrid, and many of them poisonous. This set has been excepted, and seemingly with reason, as we use them so much in food. But they do not infringe so much the general rule as has been imagined: For one species of them is very narcotic, and all are so, in some measure, when old; for this reason we only use them when very young, or blanch them, to free them of their acrimony, which is done by depriving them of *light*. When young, they are acescent, cooling, flatulent; when old, less acescent, less cooling, less flatulent, which, perhaps, may be owing to taking the skin along with them. But they are never used without a condiment.

C E L E R I.

This is an *apium*, or *petroselinum*. It belongs to a set of plants often lactescent, but, independent of this, they have a poisonous acrimony, on which account it is blanched, though it is never entirely deprived of its acrimony in this way, but more so by boiling, when it acquires a mucilaginous sweetness, and is then used in our animal broths, especially in winter, for which season it is fittest, on account of its acrimony.

K

A S P A-

LECTURES ON THE

A S P A R A G U S.

This is an intermediate substance between root and plant. In its adult state it is remarkably acrid, so only esculent in its first stage of growth. This serves to illustrate the different states of plants according to the time of their growth. There are many other plants, which, by age, turn acrid, whose first shoots we might use as food, as hops, thistles, bardana, &c. but asparagus is the only one employed at present. This is somewhat sweet, more remarkably mucilaginous; from both which qualities it is manifestly nutritive, and more so than any of the *olera* mentioned; also on account of its mucilaginous juice, though it be acedcent, yet it is less flatulent than some of them. It has often been supposed, even as we eat it, of very active parts: These, however, appear to constitute a peculiar acrimony, quite distinct from the nutritious matter, and which seems to give the smell which is perceptible in the urine of persons who use it.

C I N A R A, A R T I C H O A K.

The part in use is of a nature somewhat between herb and fruit, and is the receptacle of the flower and seed. Artichocks came early into use in Europe, and came into England about Henry the Eighth's time, and then were considered as the rarest delicacy, and sold at much the same price as pine-apples now. When thus rare, many qualities were attributed to it. Among the rest it was called aphrodisiac, but without foundation. In southern climates artichocks are eat raw, as sallad, with oil and pepper; but this practice is only fit for warm climates. In this country we use them boiled; and, if young, they are of a tender texture, and easily dissolved. They are little acedcent, so not flatulent. The taste of artichocks is sweet, which bespeaks them remarkably nutritious.

F U N G I.

F U N G I.

Next to the herbs, I have set down these. These are, indeed, herbs only in so far as some of them are above ground; but they differ so much from every other herb and even vegetables, and besides their virtues are so different, as to make it very difficult to class them. Of the fungi, three distinctions are to be noticed, Truffle, Morelle, and Mushroom, which take in the other fungi.

T R U F F L E.

This is as singular in its qualities as vegetation. It never rises above ground, nor seeds, but shoots in the earth, being a single solitary ball, somewhat firmer than mushroom. In this country they are never found, scarcely in England. From Geoffroy I learn that it is not acescent, but yields at first a volatile alkali, which shows it approaches near to the animal nature. Hence its qualities may probably be deduced; and for this reason it is less flatulent, more nourishing, and more stimulating to the system than any other vegetable; and of the great variety of vegetables, commonly said to be possessed of aphrodisiac virtues, is perhaps the only one which has any title to them. In those countries where it is used it is never found noxious or poisonous as the mushrooms. It has been alledged, that on account of its firm texture it may be of slow solution, and so difficult to digest.

M O R E L L E.

This belongs to a genus, called by Linnæus *phallus*. There are two species, viz. the one here mentioned, which is not indigenous, and another remarkably foetid, growing about hedges, the *phallus fætidus penis imaginem referens*. It is of a porous cellular texture, not laminated as the mushroom. The morelle has been said to approach in qualities to the truffle, but I consider it more as a fashionable ornament to our dishes, than as any proper food.

LECTURES ON THE M U S H R O O M S.

Physicians have disputed much about the qualities of these, some considering them as a rich nourishment and perfectly innocent when properly chosen, others asserting them to be extremely deleterious; most of the fungi are indeed of a hurtful quality, and with respect to the whole tribe the esculent are very few. Esculent mushrooms are very nutritive, very readily alcalescent, and more so without intermediate acescency than any other vegetable; therefore a rich nourishment, and much akin to animal food; on which account they may be indulged in considerable quantity to strong persons. It requires, however, skill to distinguish this esculent kind; and very few have studied Clusius, or other authors, who have been at the pains to distinguish them, especially those, viz. the servants who are employed to gather them. Perhaps our esculent mushrooms, if old, acquire a dangerous acrimony; wherefore, as exposed to all these accidents, I think it may be prudent for the most part to avoid them. In the warmer climates, they may be used as a light kind of food, but here it is preposterous to use them along with animal food, as they do not correct its alkaline tendency.

E S C U L E N T R O O T S.

Radish, Turnep. These belong to the *siliquosæ*, which we mentioned, under *nasturtium* and *brassica*, to be an acrid class, but never poisonous, and often good in medicine. This acrimony has given rise to particular opinions, some asserting that they are cooling, while others call them alkalescent. Both, however, seem to mistake. Their acrimony is diuretic and diaphoretic, and so discharges all the parts of the blood which have degenerated to an alkaline acrimony. On the other hand, I have said that all plants are *acescent*, and I except only the fungi. Perhaps, indeed, the *siliquosæ* do run on quicker to putrefaction, but this is only a difference in degree, and not in quality. Thus far of the *siliquosæ* in general.

R A D I S H.

R A D I S H.

This, as being so acrid, is used only as salad or condiment. When boiled it becomes mild, and were it not for its slender state when young, and for the difficulty of depriving it of its acrid skin when old, and its toughness, it might be used this way in the kitchen.

T U R N E P.

This is easily deprived of its acrid skin, and is also pretty large, which is the reason why it is preferred in our aliment, but is a watery weak nutriment, very flatulent, and purgative in consequence of its acescency.

S C O R Z O N E R A, T R A G O P O G O N.

These belong to the *semiflosculosæ*. The roots are remarkably free from the acrimony which appears in the plant above ground, and of what acrimony they have, they can easily be deprived, by boiling. They are sweeter than turnep, and therefore less acescent and less flatulent, but yield to the three following:

C A R R O T, P A R S N I P, and S K I R R E T.

Skirret is remarkable for being a plant from whose root Margraaf, of all the plants he tried, extracted most grained sugar, except the red beet. The carrot yields a considerable quantity of rich saccharine matter, in the form of syrup. From the parsnips, a small quantity of grained sugar, and a large one of syrup, is extracted, very viscid, with a copious mucilage. From the sweet mucilaginous matter contained in all, they are considerably nutritious. The quantity of nourishment is least in the skirret, and greatest in the parsnip, from different mixture in each of the saccharine and mucilaginous matter. In the skirret, the saccharine fermentable matter is most open, and therefore this, of the three, is most acescent and flatulent.

flatulent. All three are taken from a class of plants which abound in a deleterious acrimony : Parsnip, from its ranker smell and taste, is most suspected and most shunned. And here I may observe, that the bland nutritious vegetables are agreeable to all, but in those of a mixed or suspicious kind we see many idiosyncrasies. It is said that parsnips, when old, turn very acrid, insomuch as to have produced mania and other dreadful effects : When old, they are called madnips by the English. These effects, perhaps, might have proceeded from taking hemlock, or others of the umbelliferous kind, by mistake.

LEEK, ONION, GARLICK.

These belong to the alliaceous kind, and are all species of one genus. In their recent state they are acrid, but harmless to the human body : When, by age or climate, this acrimony is too great, we do not use them as food. In Spain, the garlic being equally mild with the onion, is used as common food. By the ordinary culinary preparation, their acrimony is dissipated, and a remarkably mild substance remains, promising much nutriment, which those who can digest them raw will certainly obtain. Though sometimes shunned as food, yet, on that account, they are employed in medicine, uniting the two qualities of pectorals, *viz.* on the account of their acrimony, being, in their recent state, expectorant ; in their boiled, on account of their mucilage, demulcent, provided the quantity taken be sufficient. Some of late, in this country, have found in the leek a somniferous quality ; but this is not yet confirmed by a sufficient number of experiments.

Besides the three here mentioned, there are several others, belonging to the same tribe, that we use as condiments, but only the leek and onion as diet. In its recent state the onion is most acrid, in its boiled one the leek retains its acrimony most tenaciously. On account of this, and some difference of texture, the onion is more easily digested, and more universally used than the leek, being more easily broke down, and more generally agreeable.

P O T A T O E.

This is an intermediate substance, between esculent roots and farinaceous seeds, and is now of frequent use, being of easy culture and plentiful product. Some have alledged it has bad qualities, but experience shows the contrary; as acescent indeed, it may be flatulent, but as it approaches more to the farinaceous seeds, it is less flatulent, and more nourishing, than any of the oleraceous herbs or roots I know: That they are farinaceous there are many proofs, as they can be applied to all the purposes of the farinaceous seeds, as for making starch, vinous liquors, &c. Though this plant belong to the genus of night-shade, and though the seeds retain the acrimony of that genus, yet the root is found to have no such qualities, being, in my opinion, of the most innocent and safest nutriment. Hence then it would appear, that the rule of plants of the same genus having the same virtues, is not so general as is commonly imagined: This, indeed, is so far from being true, that different parts of the same plant have often different virtues.

S A L E P.

This is a preparation of the root of the *orchis*, which grows plentifully in Turkey and Persia. The *orchis* of this country seems to be of much the same nature, though not so convenient, as it does not grow to the same bulk. The method of preparing salep is as follows, and given us by Geoffroy: First, they throw the roots into water, in order to free them of the skin. My author does not mention whether the water should be cold or hot; in my opinion the latter would be preferable; it is afterwards boiled in water, till, I fancy, it is perfectly soaked with it; the water is then drained off, and the root hung up on threads to dry, till it has acquired a gummy or resinous appearance. In England, it is said to be imported in this form; but here we commonly have it in a powder. Thrown into water it melts into a mucilage, of a smooth taste, somewhat sweet. Both from taste and mucilage, it is plainly of a farinaceous matter,
and

and is liable to the same inconveniencies, acescency and fermentation, especially acescency. It is extremely convenient for affording an extemporaneous mucilaginous drink, but, as we use it, it is too weak a nutriment. Hence I have no faith in its aphrodisiac virtues; but it is very fit, where acrimony abounds in the *primæ viæ*, as in dysenteries, as we find confirmed by Degner, on that subject.

Many other roots, of the farinaceous kind, might be mentioned here. Several of these roots are, in their recent state, remarkably acrid, as the cassada of Surinam already mentioned. In the same manner the Laplanders use a plant of the like qualities, which affords a mealy matter, with the same management. In this country the *arum* seems to be of the same nature; being, when recent, very acrid, by drying turned mild and farinaceous; and I make no doubt but it might be used as a farinaceous substance in food. I know one purpose which it serves in common with other *farinæ*, viz. making a fine powder for the hair.

S A G O.

It is the product of a species of oriental palm, called *todāpanna*, &c. We have long been acquainted with the substance, but often have disputed about its origin. We are now assured, that it is the pith of the tree above mentioned. When the tree is cut down, the pith is separated from its filamentous membrane, and afterwards farther cleaned by winnowing, and broke down into a fine meal, and dried in the sun. Some say that this meal is made into a pulmentum with water, dried, and afterwards formed into the grains in which we have it. This opinion I am apt to favour. Possibly, from some of our own farinaceous matters, some such substance might be procured. Sago appears to be a pure, mild, bland, farinaceous substance, having the oil and sugar intimately blended. Hence its qualities may be understood, being demulcent, as other *farinæ*, &c. It dissolves in water into a viscid mucilage, and it is owing to its viscosity that it is less acscent, and flatulent, than other *farinæ*, keeping longer, even for
twenty

twenty years, than other *farinæ*, and also in its mucilaginous state a long time. Hence it is considerably nutritious, as the East Indians experience.

F A R I N A C E O U S S E E D S.

These make the chief vegetable nutriment of all nations. They are subdivided into three kinds, 1. *Cerealía*; 2. *Leguminosa*; 3. *Nuces oleosæ*. The first is the purest *farina*; the second is more oily; the third so much more so, as to have their oil separate, and easily extracted from them. The *Cerealía* are of most universal use. Thus barley, rye, and oats are the food of the North. In the Southern parts of Asia, Africa, and America, wheat, rice, and maiz. In the East Indies they are supplied with European corn. To these millet may be added. All these substances belong to a distinct family of plants, under the name of *Culmiferæ*, or *Graminæ*. The whole of the *gramina* are of the same nature, and furnish aliment to men and domestic animals. All these might be used in food, but we employ those of largest growth and product. The properties of all are much in common. They are all acescent and saccharine, or by malting, convertible into a saccharine nature. Hence they are the proper subjects of fermentation, and hence they are acescent, though less so than any of the vegetables yet mentioned. And here, by the bye, I may observe, that in my Catalogue I had in view to place the substances in the order of acescency. To go on, we render them less acescent by a previous fermentation, as in the form of bread: So much for their assimilation. They are not so readily soluble in the stomach as most of the vegetables we have mentioned, especially when made into a paste; but in this form they have an advantage, becoming not only more nourishing for the robust, but, as I shall afterwards observe, for all. The first appearance of their solution, is to give a mucilage; hence they are demulcent. Some call them astringent: I see no foundation for this, as any appearance of their astringency is owing to their demulcent property. So far of these substances in general. We now proceed to speak of each in particular, very briefly.

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B A R -

LECTURES ON THE

B A R L E Y.

This is a sweeter grain than most of the others, its sugar being less covered by the oil; hence it is the more common subject of fermentation. It is also less nourishing, not only because the sugar is least covered, but also because it breaks down into a very bulky meal, on which account when made into paste it is least solid food, so that barley pottage, &c. makes a less solid, and therefore a lighter nourishment. It is, however, preferable for decoctions, as it renders them less viscid than any of the farinaceous substances I know.

M I L L E T.

This, from its sweetness, is manifestly of the same nature as barley, and if as large a grain, would be used for the same purposes. As tender and sweet, it is sometimes used in our puddings.

R Y E.

This is a sweet grain, and from accidents, as well as this, it has particular qualities, being in the countries where it is used the food of the poor, and therefore not cleaned accurately from its husks. Hence, and from its sweetness, it is considerably acescent, so more liable to ferment in the stomach and produce purging, which people on their first using it commonly experience.

O A T S.

This grain is a stronger nutriment than the former, as the sweetness is less obvious, the oil being more intimately blended with the sugar. This appears from more nourishment being actually obtained than from the same quantity of barley or rye. It is of a more firm and compact texture, and from being less soluble than the wheat, appears to me the reason why it gives less nourishment. Oats have been supposed heating, and to produce itch, &c.
It

It is absurd to suppose any heating quality in any of the *farinaceæ*. Heartburn produced from its use is given as an instance of its heating quality, but this is owing to the acedent quality common with other *farinaceæ*, taken unfermented. Even wheat itself, made into unleavened cakes, as the oats are commonly here, produces the same effects.

W H E A T.

This is a more perfect grain than any yet mentioned, particularly it affords a finer *farina* than oats or barley, for I believe it is scarce possible to make a scarce fine enough, in order to hinder its transmission. It is the grain of most plentiful increase, even in this country, and, in proportion to the quantity, gives a more plentiful nourishment. It is certainly the fittest for bread of any, I mean the European grains, for I imagine it is excelled by

R I C E.

This, both for largeness of produce, quantity of nourishment, and goodness, is more excellent, being of finer *farina* and more tender texture, as is plain by macerating the different grains in water; for as the rice swells to largest size, so its parts are more intimately divided. Rice is said to affect the eyes, but this is purely prejudice: Thus it is alledged a particular people of Asia, who live on this grain, are blind eyed; but if the soil be sandy, and not properly covered with herbage, and as these people are much employed in the field, this affection of their eyes may be owing to the strong reflection of the rays of light from this sandy soil; and I am more inclined to this opinion, as no such effect is observed in Carolina, where it is very commonly used.

M A I Z E.

Of this I have but little experience to speak positively of it. It is an American grain. It is of a firmer, more solid texture than

the rest ; it may, however, be broke down into a fine meal. With water, it forms the most gluey viscid substance of any of the *farinacea*, therefore should be well opened by fermentation, to make it fit for tender stomachs. In our trials we have never been able, when we imported it in times of scarcity, to make it undergo such a fermentation as to have the friability of our grains.

B U C K W H E A T.

This is a farinaceous feed, but does not belong to the same class with the former. It is employed as food in this country now very rarely. It is used for some other purposes, particularly to give a thick mucilage, of use to give tenacity to yarn in weaving, for which purpose it answers better than oats, barley, or wheat. I am led to make the same observations on it as the maiz, *viz.* that it is a hard, viscid, less soluble substance than any of the other grains. It cannot be reduced to a fine enough meal. If we could open it by fermentation, it might be useful in food.

Having thus treated of the principal species of the *farinacea*, I now come to their preparations. By much the most common of these is bread, and without somewhat of this form no nations seem to live. Thus the Laplanders, having no corn of their own, make a sort of bread of their dried fishes and of the inner rind of the pine, which seems to be used not so much for their nourishment as for supplying a dry food. For this mankind seem to have an universal appetite, rejecting bland, slippery, mucilaginous foods. This is not commonly accounted for, but seems to depend on very simple principles. The preparation of our food depends on the mixture of the animal fluids in every stage. Among others the saliva is necessary, which requires dry food as a necessary stimulus to draw it forth, as bland, slippery fluid aliments are too inert, and make too short stay in the mouth to produce this effect, or to cause sufficient degree of mastication to emulge that liquor. For this reason we use commonly dry bread along with animal food, which otherwise would too quickly

quickly be swallowed. For blending the oil and water of our food, nothing is so fit as bread, assisted by a previous manducation. For which purpose bread is of like necessity in the stomach, as it is proper, that a substance of solid consistence should be long retained there. Now I have said that the animal fluids must be mixed with our aliments, in order to change the acescency it undergoes. But liquid foods would not attain this end, whereas the solid stimulates and emulges the glands of the stomach. The bread then appears to be exceedingly proper, being bulky without too much solidity, and firm without difficulty of solution. Although the bread I here mention only of our own *farinacea*, yet in different countries others are used, as sago, &c.

Bread is of two kinds, leavened or unleavened, *i. e.* subjected to fermentation, or only simple dough made of water. Leavened bread is of two kinds; first, as made of dough set to ferment naturally, and afterwards employed as a ferment to other dough; secondly, where we employ a ferment of vinous liquors. The first is a precarious uncertain operation in itself, and more especially so in its application to a fresh mass of unfermented dough. This is the method used in the southern countries of Europe. The yeast used in the second more preferable method is a more active ferment, and less liable to accident than the leaven, even although it is subject to be used too old, &c. and so we find British bread better raised than the French and more spongy; but it has a disadvantage, especially to strangers, from the disagreeable bitterness of hops often tainting our yeast, and so the bread as formed with it. The advantages of leavened bread are to promote assimilation and solution.

As to the first, all vegetable food becomes naturally more or less acescent, and it is the mode of this that forms a disease, *viz.* when the vinous fermentation takes place. Indeed, I also own, that disease may sometimes depend on the quantity of acid produced. One way of obviating the vinous fermentation is, by giving our food somewhat of the acetous tendency, or throwing into the stomach some-

somewhat to have this effect. Unfermented, or too little fermented bread, will cause heart-burn; when too acid from over fermentation it will purge. This then explains the use of bread, and the degree of leavening necessary, *viz.* that it should not be so much leavened as to purge, but sufficiently so, in order to check the noxious vinous fermentation. The more acescent grains, as barley and rye, are more especially purgative, and the husks of all grain are somewhat of this nature, while the pure farina has less of it. Thus then the finest bread will be least purgative, and the coarsest most certainly so. So far as to the assimilation, now with regard to the solution.

In all bodies there is blended a certain quantity of air, and nothing promotes solution more than the extrication of this air, which is particularly effected by fermentation. Application of heat, of a menstruum applied, &c. would be of little avail, unless assisted by a fermentation going on in the stomach, which is particularly assisted by bread, which, besides the advantages of solidity, &c. is of use, as having its own texture already opened, to prove a ferment to other food. Bread is necessarily in a solid and dry form, and hence is less soluble. To prevent this, and at the same time preserve the solid form, is the purpose of baking. To make the bread cohere, water is used, and there is no greater secret in the art of baking than the quantity of this used, which, if too great, makes the whole concrete into a firm insoluble mass. Here we are apt to be deceived, as meal, like clay, will absorb a considerable quantity, and still retain its mealy form. This mixture must be made not with gentle stirring, but accurate kneading, in order to make a small quantity of water suffice; for if gentle mixture were used, it, like the clay before-mentioned, would take in too much water, before it would cohere. After the mixture is made, we proceed to drying, which must be performed suddenly, all slow drying giving to substances a tough compact form, while sudden drying gives a spongy porous texture. This is illustrated in making of paper, which, slowly dried, is of fine compact texture; whereas, if taken suddenly

denly from the mill, it is porous, sinking, and spongy. Hence we can apprehend what are the qualities of bread properly dried; for the water, interposed as a gluten, is dissipated, and leaves the bread in a considerable degree of friability. Its friability depends also on the fineness of the meal, and quality of the ferment applied, rendering it fit for manducation and solution in the stomach: Hence the difference between new bread and stale; the latter being more friable, and more easily soluble, is preferable, provided it has got none of the putrefactive taint: However, in strong stomachs, this may too easily be dissolved and digested, and therefore, in such cases, the other is to be chosen.

As to unleavened bread, which is used both here and in many other parts of Europe; this necessarily comes into a firm and tough cake, not having the advantage of fermentation to extricate the air. On account of this closeness of texture, it will retain the water more tenaciously: Hence the reason of the different form of unleavened bread being made out into thin cakes to favour their drying, which the more expeditiously it is done, for reasons already assigned, without burning, it is the more soluble, friable, and porous. People obliged to use unleavened bread, have thought of adding butter, to render it more friable; but from this, perhaps, it is less miscible with the watery fluids, and those in the stomach; and hence, as we have said, it is more acrescent, and apt to produce heart-burn. We also sometimes use bread leavened to a very great degree, under the name of four cakes. These are made by adding a good deal of water to give them visciditv, that they may be thinly extended. To obviate the effects of this visciditv, they are rendered proportionably more sour, on which account, when taken in considerable quantities, they are purgative. So far with regard to bread.

We now proceed to the other preparations of *farinacea*. These, when made into paste with water, and exposed to a heat capable of coagulating our fluids, are hardened into indissoluble masses; but
when

when they are mixed with cold water, and afterwards exposed to a gradual heat, their solution is effected. This is illustrated by the preparation of hasty-pudding and water-gruel. The first practice is the most common, probably from being more solid and longer retained in the stomach, till it undergoes the proper acedent changes, while the water-gruel is little considered as a food, but rather as a drink, because it passes quickly off. All the puddings are analogous in their preparation to the hasty pudding. The *farinacea* prepared by coagulation are of three kinds, pudding, pancake, and baken paste; pudding is of two kinds as made of flower or bread. The first is coagulated into a firm mass, which we should not be able to dissolve unless mixed with other matters, as suet; on the contrary, that made of bread, still remains, after being drenched with water, easily soluble. These are the common forms of pudding, though sometimes they are made of grain, as rice, millet, &c. In this case the grain is first boiled, and then dried to a proper consistence, and mixed with variety of substances. In all of these forms milk is commonly used rather than plain water, as giving a less tough consistence. Eggs are also used to obviate acedency, as being of animal nature. 2. Pancakes. Here somewhat of a firm texture is required, and they are made out into thin plates for the same reason as the unleavened cakes. More water is necessary to give them tenacity, and butter is added to prevent fermentation. 3. Paste. This is sometimes made of fermented bread, but ordinarily of flower. As it is to be converted into various forms, it is made considerably tenacious. This is done by adding a large quantity of water, by slow drying, and other means. It would, therefore, be very hard without the addition of butter, and, after all, it is very indigestible, and apt to produce heartburn and acedency. Perhaps this is increased by the burned butter, from a certain sensibility in the stomach, which occasions all empyreumatic oils to be long retained, and so turn rancescent and acid.

LEGU-

L E G U M I N A.

These are unctuous and oily, and have the oil intimately blended with a saccharine matter, so that they afford a pure and strong nourishment; and that they do so appear from experiments made on domestic animals. It is observed too that servants, *cæteris paribus*, living on low grounds, where the *legumina* grow in great plenty, and are their chief food, fatten remarkably, and then, when transported to the higher ground, they turn weak and lean, living mostly on the *culmiferous farinacea*, and sometimes cannot recover them without having recourse to the former diet. That the *legumina* are intended for food, a curious reason may be assigned. The *culmiferous*, indeed, are intended for food, but the same ground cannot produce them above one or two years without being exhausted; whereas the *legumina* have no such effect, and, interposed between the culmiferous crops, make these be borne more easily: And thus I have known a field, by alternate crops of the *culmiferæ* and *legumina*, after twenty-four years, without any particular culture, capable to produce the same crop of *culmiferæ* as at first. This practice is very ancient, and therefore *legumina* very early must have made a part of food.

Legumina are of a more firm texture and less soluble, therefore their use in food should be confined to the hardy robust farmer. They are more flatulent than most vegetables, at least than the *farinacea*. This depends not merely on that quantity of saccharine matter (which appears to be considerable, as appears from the rich sweet procurable from them) as the bad effects of this are obviated by its intimate mixture with their oil, but on the great quantity of air there is lodged in that texture, and which, during their fermentation, is copiously extricated; and hence they are improper aliment for weak stomachs. They are used in two different states, not only when fully ripe, (their effects in which case I have just now mentioned,) but also when very tender and green, at which time

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they

they have not attained the oil they afterwards gain, approach in their qualities to other *olera*, and are hardly more sensibly flatulent than these; but after all, in compensation for these properties, their nutriment is proportionably diminished.

In the Catalogue I have only set down of the *legumina*, peas, beans, and French beans, though many more of the same kind might have been added, as lentils, &c. but they are purposely omitted, as all of the same qualities, and I have only mentioned the three most commonly used.

The *phaseoli*, or French beans, are here little known in their mature state, but are used with their cod in the manner of *olera*, than which they are somewhat more firm and more nutritious. The *phaseoli*, in their ripe state, have a bitter disagreeable husk, deprived of which they are more tender, more soluble, and less flatulent than other *legumina*, even the peas, and for the purposes of peas, by the better sort they are, for this reason, sometimes imported, as for puddings.

Peas, both raw and ripe, are of a more tender and soluble texture than beans, and hence the better sort seldom employ the bean, but use the pea for culinary purposes, as puddings, &c.

N U C E S O L E O S Æ.

This term is not strictly proper in a botanical sense, but common language has authorized it. All these consist of a farinaceous substance by itself, and have an oil in their composition, not mixed as in the *legumina*, but separate, and easily obtained by proper expression. Though this oil be separate, yet, by triture with water, it may be united with the farinaceous substance into an homogeneous emulsion; and most of the preparations of *nucēs oleosæ* in food should be made on this foundation. *Nucēs oleosæ* are less flatulent than the *legumina*, and even than the *farinacea*, and, on account of their
copious

copious oil, more nutritive, but hence more difficultly assimilated, and its effects appear by stuffing the lungs, especially such as were formerly affected with any disorder of the asthmatic kind.

Let us now proceed to treat of the *Nuces oleosæ* in particular. I have ranked them in the Catalogue according to alphabetical order, but according to the proportion of oil they may stand thus:

AVELLANA, CASTANÆ, JUGLANDES, PISTACÆ,
AMYGDALÆ, CACAO.

HAZEL NUT.

This is less oily, and has its oil more intimately blended with the farinaceous substance than in the rest, but all this is to be taken with distinction, of those nuts in different countries, climates, and seasons. Thus in the southern, drier and hotter climates, the oil is more copious and separate. Before these arrive at maturity, they are more watery than the other nuts.

CHESTNUT.

This I suppose was the food of the ancients, and not the acorn of the oak, which is scarcely reducible to food. The later Botanists have very justly reduced the chestnut tree to the genus of the *fagus*, and this was probably the ancient esculent one. Chestnuts still, in some countries, make the chief parts of food to the lower kind of people, as in the fertile plains of Lombardy. They afford a copious nourishment, are somewhat of the nature of the *legumina*, having their oil intimately blended, and much air being fixed in their substance, and they are the most flatulent of the *nuces oleosæ*.

WALNUTS.

These are more oily than the former, and have that oil more separate.

M 2

PISTA-

LECTURES ON THE

PISTACHIO.

This still more abounds in oil, and may give a more copious nourishment, but it is scarcely possible to separate from them the terbinthinal acrimony of the tree.

ALMONDS.

These are the most agreeable of the nuts, but are no where produced in such quantity as to afford a food. They are divided into bitter and sweet, and the oil is said to be obtained equally sweet from both. And, indeed, it appears, that bitter and sweet almonds are only varieties, which has made it a doubt whether the bitter almond ought to be used in food. The farina and oil of it are exactly the same, but its bitter makes it suspicious, as the lawrel bitter, afterwards to be mentioned, may be procured from it, and as it is a poison to many animals. Some men, indeed, use them with impunity, but I think it a dangerous practice. They are, however, deprived of this acrimony by heat, and hence are used in baking; but we should not from this infer, that the use of them, when fresh, is allowable.

C A C A O N U T S.

These contain the largest proportion of oil, and thence are hardly used without preparation, by mixing the oily with the farinaceous part, and on the accuracy of this mixture the quantity of their nourishment depends, as well as its easiness of digestion. The chocolate made in Portugal and Spain is not near so well prepared as the English, depending, perhaps, on the machine employed here, viz. the double cylinder, which seems very well calculated for exact triture. If perfectly prepared, no oil appears on the solution. London chocolate gives up no oil like the foreign, and it also may, in some measure, depend on the thickness of the preparation. The solution requires more care than is commonly imagined. It is proper
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to break it down, and dissolve it thoroughly in cold water, by milling with the chocolate stick. If heat be applied, it should be done slowly; for if suddenly, the heat will not only coagulate it, but separate the oil, and therefore much boiling after it is dissolved is hurtful. Chocolate is commonly required by people of weak stomachs, but often rejected for want of proper preparation. When properly prepared it is easily dissolved, and an excellent food where a liquid nutrient vegetable one is required, and is less flatulent than any of the *farinacea*.

O L I V E S.

These might be referred to the head of Condiment, and they are even used only pickled in those countries where they are native, and their disagreeable bitter is by this means corrected. I only mention them here, on account of the oil they afford so copiously.

I formerly started a question about the use of oil, viz. Whether oil was necessary for nourishment, or only for supplying the great quantity of oil in the system? Though the latter opinion be granted, yet I imagine oils are also directly nutritive, being copiously mixed and intimately blended with the other parts of our aliment, and thus constituting a part of the proper nutritious fluid. They are also necessary for assimilation; for the acescency of the *fructus acido dulces* would be difficultly subdued without these. Hence the use of oil and butter is almost as universal, and as necessary, as that of the *farinacea*. They give an aliment which approaches most to that obtained from animal food. They give a more dense elastic blood, and probably, too, a more putrescent one than vegetables. Their viscosity also remains in some degree in the blood vessels, on which account we shall mention them under the class of medicines. Dr. Russel, in his *Natural History of Aleppo*, tells us, “that in certain seasons, when they use a great quantity of oil there, they are then disposed to somewhat of fever, with remarkable infarction of the lungs, which symptoms wear off on
“retrench-

“retreating the use of oil.” Considered as aliment, oil is difficultly perspired, the meaning of which shall be afterwards explained. These are the properties in general of our oily nourishment, whether oil or butter. Here a question arises, Whether the Northern or Southern countries are supplied with the most agreeable substance of this kind? With regard to butter, it has always a quantity of animal mucilage mixed with it, and hence is easier miscible with water. But hence, although from the mucilage it receives consistence and somewhat of miscibility with water, and hence more easily digested, yet from this very mixture it is more rancid, and does not keep so long fresh as oil, and hence produces disorders in the *primæ viæ*. In the Southern countries oil is procured little disposed to rancidity, and therefore, where it can be used perfectly fresh, it is not so apt to produce rancid disorders as butter. But here it is not of equal advantage, and I never saw any in this country but had some degree of rancidity, and therefore, we ought not, in any case, to prefer the imported oils to good fresh butter. However, as fresh oil is certainly eligible, and as almonds, whose oil is better than that of olives, afford it but in inconsiderable quantity, I think we ought, as we have native seeds which will afford a pure oil in pretty large quantity, to endeavour to procure it from them.

D R I N K.

The general use of drink is to supply fluid, facilitate solution, in consequence of that to expedite the evacuation of the stomach, and promote the progress of the aliment through the intestines: for, by the contraction of the longitudinal fibres of the stomach, the *pylorus* is drawn up, and nothing but fluid can pass, which, by its bulk, makes a hurried progress through the intestines, and so determines a greater excretion by stool, as less then can be absorbed by the lacteals. Hence a large quantity of common water has been found purgative, and, *cæteris paribus*, that aliment which is accompanied with the largest proportion of drink, makes the largest evacuation by stool.

stool. Here a question has arisen, about where the feculent part of the aliment is first remarkably collected? It is commonly thought to be in the great guts, but undoubtedly it often begins in the lower part of the *ileum*, especially when the drink is in small proportion, and when the progress of the aliment is slow; for when the contents of the guts are very fluid, they are quickly pushed on, and reach the great guts before they deposit any feculency. Another effect of drink is, to facilitate the mixture of the lymph, reflux from every part of the system, with the chyle. In the blood-vessels, where all must be kept fluid, in order to proper mixture, drink increases the fluidity, and gives tension, by its bulk, without concomitant acrimony or too much elasticity, and so strength and oscillatory motion: Hence drink contributes to sanguification, as sometimes food gives too dense a nutriment to be acted upon by the solids; and hence also we can see how drink promotes the secretions. These are the effects of drink in general; but what I have said must be taken with some limitations, for the more liquid the food, it is sooner evacuated, and less nourishment is extracted: Hence drink is, in some degree, opposed to nourishment, and so, *cæteris paribus*, those who use least drink are most nourished.

All the effects of drink above-mentioned are produced by simple water, and it may be said, that other liquors are fit for drink in proportion to the water they contain. Water, when used as drink, is often impregnated with vegetable and farinaceous substances, but, as drinks, these impregnations are of little consequence; they add, indeed, a little nourishment, but this is not to be regarded in a healthy state. Sometimes we impregnate water with the *fructus acido dulces*, and then, indeed, it acquires other qualities of considerable use in the animal œconomy. All drinks, however, may be reduced to two heads; first, pure water, or where the additional substance gives no additional virtue; secondly, into the *fermentatæ*. Of the first we have already treated, and the latter have not only the qualities of the first, but also qualities peculiar to themselves.

Fermented

Fermented liquors are more or less poignant to the taste, and better calculated to quench thirst. Thirst may be owing to various causes; first, to defect of fluid in the system, which occasions a scanty secretion in the mouth, fauces, and stomach; the dryness of the mouth and fauces will also, in this case, be increased, by their continual exposure to perpetual flux and reflux of the evaporating air; secondly, thirst depends on a large proportion of solid viscid food; thirdly, on an alkalescent aliment, especially if it has attained any thing of the putrefactive taint; fourthly, on the heat of the system; but this seems to operate in the same manner as the first cause, giving a sense of dryness from its dissipation of the fluids. The fermented liquors are peculiarly adapted for obviating all these causes, stimulating the mouth, fauces, and stomach, to throw out the *saliva* and gastric liquor by their poigancy; by their acescency they are fitted to destroy alkalescent acrimony, to quench thirst from that cause; by their fluidity they dilute viscid food; though here, indeed, they answer no better than common water. In two ways they promote the evacuation by stool, and progress through the intestines; first, by their fluidity and bulk; secondly, by their acescency, which, uniting with the bile, forms the peculiar stimulus formerly mentioned. Carried into the blood vessels, in so far as they retain any of the saline nature, they stimulate the excretories and promote urine and sweat, correcting thus alkalescency not only by mixture, but dissipation of the degenerated fluids.

Many Physicians, in treating of fermented liquors, have only mentioned these qualities, rejecting their nutritious virtue, which certainly ought to be taken in; though by expediting the evacuation by stool they make less of the nutritious parts of the aliment to be taken up, and by stimulating the excretories make these nutritious parts to be for shorter time in the system. All these, and many more effects, arise from fermented liquors. Their acescency sometimes promotes the disease of acescency, by encreasing that of vegetables, acting as a ferment, and so producing flatulency, purging, cholera, &c. so that, with vegetable aliment, as little drink
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is necessary, the most innocent is pure water; and it is only with animal food that fermented liquors are necessary. In warmer climates *fermentata* would seem necessary to obviate alkalescency and heat. But it should be considered, that though fermented liquors contain an acid, yet they also contain alcohol, which, though it adds stimulus to the stomach, yet is extremely hurtful in the warmer climates, and wherever alkalescency prevails in the system. Nature, in these climates, has given men an appetite for water impregnated with acid fruits, *e. g.* sherbet, but the use of this needs caution, as in these countries they are apt to shun animal food, using too much of the vegetable, and often thus causing dangerous refrigerations, choleras, diarrhœas, &c.

Of varieties of fermented liquors, I shall only mention here the chief heads on which these varieties depend; first, they are owing to the quality of the subject, as more or less viscid, upon its capacity also of undergoing an active fermentation, although, perhaps, the more viscid be more nutritious. Hence the difference between ales and wines, by the first meaning fermented liquors from *fari-nacea*, by the second from the fruits of plants. It depends, secondly, on the acerbity, acidity, nature, and maturation of the fruit. Thirdly, the variety depends on the conduct of the fermentation. In general, fermentation is progressive, being at first active and rapid, detaching the fixed air, or *gas sylvestre*, at the same time acquiring more acid than before. These qualities of flatulency and acidity remain for some time, but as the fermentation goes on, the liquor becomes more perfect, no air is detached, and alcohol is produced, so that fermented liquors differ according to the progress of the fermentation, and have different effects on the system. When fermentation is stopped before it comes to maturity, though naturally it proceeds in this way, yet by addition of new ferment it may again be renewed with a turbid intestine motion.

LECTURES ON THE CONDIMENTA.

Condimenta are such substances as are taken in with our food, to correct its bad tendencies, or to give it more agreeableness to the stomach. They are of different kinds.

I. AROMATA.

These are certain acrid substances that we take in to give more taste to our aliment; for though I said our aliment should be bland, yet the system requires it should be sapid. This we obtain from the aromata, which strictly are such as are pungent with some degree of fragrancy, as cinnamon, cloves, nutmeg, mace, pimento, &c. which are the produce of the warmer climates. Analogous to these, in Europe are the umbelliferous seeds, anise, carraway, coriander, and the sweet herbs. All these stimulate the stomach, and promote the peristaltic motion, are antispasmodic, taking off the spasms arising from the flatulency of our food, and antiseptic, moderating the putrid tendency of our aliment in the intestines. From these qualities they are fitly conjoined with our vegetable food, stimulating the stomach, promoting the mixture and afflux, in proper quantity, of the animal fluids, and obviating the effects of flatulency. They ought properly only to be used in those countries where they are produced, because from the heat people *there* live chiefly on vegetable diet. They are introduced *here* unfitly, and as a part of luxury, as any antiseptic virtue they have would be overcome by their stimulus, &c.

There are certain acrid plants, the produce of our Northern climates, where animal food is indulged most freely and safely, and where that being insipid, is fitly conjoined with these acrid substances, as condiments, &c.

The cress kind, radish, *i. e.* horse-radish, mustard, cresses themselves, and indeed all the *siliquosæ*. These give taste to insipid aliment,

aliment, stimulate the stomach, and encrease the peristaltic motion; they have no considerable antispasmodic virtue, are manifestly powerful diuretics and diaphoretics, stimulating the excretories to throw out alkalescent matters. Hence they are fitly conjoined with animal food. The garlic tribe have the same virtues, stimulate the stomach, are diuretic and diaphoretic, and are used in our animal food as condiments. These are the condiments taken from recent vegetables; there are also others, salt, vinegar, and sugar.

S A L T.

This is the most useful substance as a sapid, is most universally used, and least apt to pall, but beyond that quality I am at a loss what to say, as its effects are not yet well explained by Physicians. It is said to be antiseptic; but this seems contradicted by observing, that it is often used with vegetables, and that carnivorous animals are poisoned by it, where its antiseptic quality would be most necessary; while the graminivorous seem fond of it, and the husbandman often gives it to his cattle; and sure here it cannot act by its antiseptic quality. Dr. Pringle says, that a small quantity of salt is septic, and a large one antiseptic: But here I think the experiment was not accurate, as the salt he employed was the common table salt, which is far from being a pure common salt. How this impure salt acted in promoting putrefaction may be easily conceived, *viz.* by the superabundant alkali, or earth of the salt absorbing the acid, which would, in some measure, have prevented putrefaction. Till once it be ascertained that pure common salt is, in small quantity, a septic, we forbear accounting for this phenomenon. Common salt stimulates the stomach, excites appetite, and promotes excretion of gastric liquor. The nature of this body, as we take it with our aliment, is little understood. As it has been found to be septic, we, apt to run into extremes, have concluded it produces scurvy from that power. Although scurvy is apt to be produced from salted meats, yet experiments evince that the same effects will result from animal foods alone, long continued, and salt alone has not yet been seen to produce that disease.

VINEGAR.

This contains various substances, and among the rest a nutritious or a saccharine one, which, however, in accounting for its effects, may be entirely neglected, and we only consider it here as a condiment. As such, it gives a grateful taste to the aliment, stimulates the stomach, and excites appetite. As an acetous ferment, it determines the acetous fermentation in foods, and hence in degree is of use even with vegetables themselves.

It is enquired whether it is hurtful as an acid, and avoided by those who are affected with recent acedent vegetables? In large proportions, like other acids, it may have bad effects, and therefore in such quantity ought to be avoided by these.—Will it produce spasms, flatulencies, &c. like recent acedent vegetables? It may; for the acetous fermentation is never conducted with such care as the vinous, and there is commonly in vinegar a saccharine matter remaining, which has not yet undergone its first fermentation, which may be excited in the stomach, and produce all its bad effects. Its antiseptic virtue is proved by experiment, and therefore is properly used with animal food. Its antiseptic property, however, is not very powerful.

Other acids are used as condiments with animal food, as juice of lemons, which, as acerb, is therefore less liable to active fermentation; but as their acerbity differs much in different lemons, the same quantity of vinegar is more seldom found to have bad effects than of lemon juice, which, however, is more universally preferred to the vinegar, which, besides its qualities formerly mentioned, is often rōpy, foul, and disagreeable. But in my opinion, if due attention is given to the quality of the vinegar, it is a much safer condiment.

Glauber proposed the muriatic acid as a proper condiment, and has proved its use in several alimentary purposes, and says, That it is.

is incapable of fermentation itself, and preventing acescency in vegetable as well as putrescency in animal aliment. This, however, has not been tried, and as it is a substance unconquerable by our assimilatory organs, it would seem rather to be considered as a medicine, and never introduced as a condiment.

S U G A R.

This is one of the principal ingredients in vegetable aliment, and affords a pure and copious nourishment; it is frequently employed as a condiment also, but cannot be used for the same length of time, and in such quantity, as common salt, as its taste soon palls on repetition. It may likewise be considered as an antiseptic, and, as a vegetable substance, is capable of all the effects of acescent vegetables. With vegetables it increases their quantity of nutriment, but does not, I believe, correct their bad qualities, or hinder fermentation. It is less actively fermentable than the *acido dulces* or *olera*, more so than the dried juice of fruits, as figs, &c. it ought, therefore, to be used sparingly with vegetables, and most with animal food: If not over expensive, it might be used with the latter as an antiseptic, being more viscid, and less liable to be decomposed by solution, than common salt.

Since sugar came to be commonly used, disputes have arisen about its wholesomeness. I have already laid the foundation of judgment on this subject; and many faults, without justice, have been ascribed to it: It may indeed, by its acescency, be troublesome in the *primæ viæ*, but no experiments prove its bad consequences in the blood vessels. It has been said to spoil the teeth: Its effects in spoiling the teeth may indeed, in some cases, be just, as where they have a more than ordinary degree of sensibility; or it may, perhaps, by what adheres of it about them, turning acid, corrode them: But faults of this kind are oftener imputed to it than it deserves, for raisins are more acescent, and yet whole nations use them with impunity; and the mischiefs of what is called in Scotland eating of sweeties, are wrongly imputed to sugar. When arts were

in a languishing state in Europe, men lived much on animal food, and then scurvy was frequent; but now, when vegetables are more used, it is a rare disease, appearing only in long voyages or long winters, where vegetable food is not to be had. Putrid fevers, and epidemics, are also less frequent, as may appear from Sydenham's and Pringle's Observations, which I impute to the more frequent use of sugar. Having now spoke of sugar in general, we come to particular sugars.

Coardest sugar is most acescent, most actively and readily fermentable, which is also increased by its viscosity; and other sugars, the finer and purer they are, have less and less of these qualities. From the qualities above-mentioned, coardest sugar is most laxative, and most productive of the disorders arising from an active fermentation. Fine sugar never turns drier, nor ceases to be nutritious, but is, however, always somewhat acescent. The lime employed never enters into the composition of the sugar, and only renders it less acescent, and less actively fermentable.

Having mentioned the *Condimenta*, we now come to aliments preserved by common salt, &c. But as animal food only is commonly preserved by common salt, I pass it over till we come to these.

VEGETABLE ALIMENT preserved by SUGAR.

This preparation is so performed, that the saccharine matter is intimately and every where introduced into the pores of the vegetable substance; so that preparations of this kind may be considered as entirely sugar, participating of none of the qualities of the vegetable, excepting those of the acrid kind, as ginger. The same may be said of

VINEGAR PRESERVES,

As vinegar is applied only to insipid substances, or which, by boiling or soaking with it, become so; and so preparations of this kind
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may be considered as so many sponges containing vinegar, and may indeed be employed to increase the flavour of food, and, as antiseptics, will go as far as vinegar itself only. With regard to the small quantity of *aromata* joined to these, their effects may be known from what we have said before.

A N I M A L F O O D.

We formerly distinguished animal from vegetable food, by saying, that it required no assimilation, but only solution and mixture. But this is not so clear as has been commonly imagined. What gives rise to this doubt is, that carnivorous animals live on that without any vegetable mixture, or even salt, by which they are even poisoned, living long without putrid accumulations, which, though for a short time might produce little inconvenience, yet, in the course of life, would certainly produce bad consequences. This accumulation is obviated by particulars in their œconomy, as short intestines; whereas in the phytovorous, long intestines are given to give rise to putrescency. Again, the carnivorous animals are exposed to putridity, from their irregularity, taking in water in small quantity, &c. They are said to be of quick excretions; but this is contradicted from their being capable to bear long abstinence, being gluttoned to-day with a full meal, and starved perhaps for several weeks after, which would be in other animals as the surest means of pushing putrefaction to the greatest degree. From all this we must suspect something in carnivorous animals to prevent putrefaction.

Here let me offer a conjecture, viz. that the food in the stomach of carnivorous animals suffers a decomposition in some degree, and becomes acid. This appears probable, from the change which decocted or elixated animal substances undergo, these broths becoming in time acedent: Besides, it has been said, that an acid is always found in the stomach of these animals: If it be really so, it can proceed from no other source but decomposition. However, in accounting for the effects of animal food on the human body, we may neglect this, and consider the diseases thence arising to proceed from putridity;

putridity ; for no man, as has been proved from experiment, can bear animal food alone, without nausea, for even a few days. Putrescency takes place in the stomach and intestines, in the first producing nausea and thirst, which would oftener occur unless obviated by the acid of vegetables conjoined with it ; in the second, violent purging, cholera, and dysentery, from putrid exhalations.

Next, as to the solution of animal food. This, though seemingly of greater cohesion, is of more easy solubility than vegetables. However, I do not mean by this a quicker but a more entire solubility ; for very firm animal substances are extracted and dissolved in the human body, and the firmest, as bones, in stomachs *similar* to the human, though, at the same time, I am convinced, that vegetables, which are not dissolved at all, have yet their juices more *quickly* extracted than animal food, and pass *sooner* off. For easiness of solubility does not depend so much on the firmness of texture, as on the viscosity of the juice. Thus the more young and succulent animal food is less soluble than the old, veal than beef, lamb than mutton, &c. And Dr. Robinson relates, that a Gentleman who used to take an evening puke, would throw up veal unchanged, while of beef there were no remains. Animal food excites the fever mentioned as consequent on digestion in a greater degree than vegetable, giving a greater stimulus to the stomach, and so to the whole system ; and the difference of animal foods depends on the putrescency and viscosity taken together. Thus young food, being more viscid than old, though less putrescent, is yet less soluble. Animal food differs also as to its perspirability, or passing off the last concoction. Sanctorius found mutton the most perspirable, and Keil and he call oysters least so, so animal foods differ in their perspirability, according as in their nature they approach nearer or recede farther from these.

COMPARISON of ANIMAL and VEGETABLE FOOD.

First, *With regard to their difference in the stomach.* What we have said of decomposition, or acescency of animal food, never comes to a morbid degree, but the disease is always on the side of putrescency, which degree, however, seldom occurs, except when animal food has been repeated in too great proportion, or too frequently, either from necessity, or too delicate luxury. The acescency, then, of vegetable aliment is more frequent, and ought more to be attended to than the alkalescency of animal, which last, even in weak stomachs, is seldom felt; while acescency affects much both the stomach and system.

(2.) *With regard to their difference of solution.* Heaviness, as it is called, is seldom felt from vegetables, except from tough farinaceous paste, or the most viscid substances; while the heaviness of animal food is more frequently noticed, especially when in any great quantity. Difficulty of solution does not depend so much on firmness of texture, (as a man, from fish of all kinds, is more oppressed than from firmer substances) but on viscosity, and hence is more frequent in animal food, and especially in the younger animals; all which makes it evident, that both solution, and the passage of the food from the stomach, is more owing to viscosity than firmness.

(3.) *With regard to mixture.* There is no instance of difficult mixture in vegetables, except in vegetable oils, while animal foods, from both viscosity and oiliness, especially the fatter meats, are refractory in this respect. I do not know whether the difference of animal and vegetable foods might not be referred to this head of mixture; for vegetable food continues long in the stomach, giving little stimulus: Now the system is affected in proportion to the extent of this stimulus, which is incomparably greater from the animal viscid oily food, than from the vegetable, firmer, and more aqueous. However, let me observe here, that there are certain

applications to the stomach, which have a tendency to bring on the cold fit of fever, independent of stimulus, merely by their refrigeration; and this oftner arises from vegetables; as we see, in those hot countries where intermittents prevail, they are oftner induced from a surfeit of vegetable food than animal. A proof of this is, that when one is recovering of an intermittent, there is nothing more apt to cause a relapse than cold food, especially if taken on those days when the fit should return, and particularly acescent, fermentable vegetables, as sallad, melons, cucumbers, &c. *acido dulces*, &c. which are, in my opinion, those foods which are the most frequent cause of epidemics; therefore, when an intermittent is to be avoided, we shun vegetable diet, and give animal foods, although their stimulus be greater; and this, among others, is a proof that fever depends very much on the cold fit. Upon the whole, in attending to these four heads, *viz.* Assimilation, Solution, Mixture, and Stimulus, we shall be able to judge of the choice of food with regard to the *stomach*.

Next, *as to the intestines*. When the putrescency of animal food has gone too far, it produces, as I have said, an active stimulus, causing *diarrhæa*, *dysentery*, &c. But these effects are but rare; whereas from vegetable food and its acid, which, united with the bile, proves a pretty strong stimulus, they more frequently occur, but luckily, however, are of less consequence, if the refrigeration is not very great. In the autumnal season, when there is a tendency to dysentery, if it is observed that eating of fruits bring it on, it is rather to be ascribed to their cooling than stimulating the intestines.

As to the effects of animal and vegetable food on stool. Wherever neither putrefaction, nor acidity, have gone a great length, I alledge that animal food keeps the belly more regular, and vegetable food gives a greater proportion of feculent matter, and when exsiccated by the stomach and intestines, is more apt to stagnate, and produce slow belly and costiveness than animal stimulating food, which, before it comes to the great guts, where stoppage is made, has attained

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a putrefactive tendency; and gives a proper stimulus, and thus those who are costive, from vegetable food, when they have recourse to animal, are in this respect better.

4. *Effects of animal and vegetable foods in the blood vessels.* They both give a blood of the same kind, but of different quality. Animal food gives it in greater quantity; being wholly, as the expression is, convertible *in succum et sanguinem*, and of easy digestion; whereas the vegetable is more watery, and contains a portion of unconquerable saline matter, which causes it to be thrown out of the body by some excretion. Animal food affords a more dense stimulating elastic blood than vegetable, stretching and causing a greater resistance to the solids, and again exciting their stronger action. It has been supposed, that acerbity of vegetable food is carried into the blood vessels, and there exerts its effects; but the tendency of animal fluids is so strong to alkalescency, that I cannot be persuaded an acid acrimony ever existed in animal blood. Animal food alone will soon produce an alkalescent acrimony, and if a person who lives entirely on vegetables, were to take no food for a few days, his acrimony would be alkalescent.

We are next to take notice of the quantity of nutriment these different foods afford. Nutriment is of two kinds; the first repairs the waste of the solid fibres, the other supplies certain fluids: The chief of these fluids is oil. Now, as animal food is easier converted, and also longer retained in the system, and as it contains a greater proportion of oil, it will afford both kinds of nutriment more copiously than vegetables. A proof that corpulency is produced most by animal food is, that in England there are more fat people than in any country of twice the bulk in the world.

5. *Lastly, As to the different degrees of perspirability of these foods.* This is not yet properly determined. Sanctorius constantly speaks of mutton as the most perspirable of all food, and of vegetables as checking perspiration. This is a consequence of the different sti-

mus those foods give to the stomach, so that persons who live on vegetables have not their perspiration so suddenly excited. In time of digestion, perspiration is stopped from whatever food, much more so from cooling vegetables. Another reason why vegetables are less perspirable, is, because their aqueo-saline juices determine them to go off by urine, while the more perfectly mixed animal food is more equally diffused over the system, and so goes off by perspiration. Hence Sanctorius's accounts may be understood; for vegetable *aliment* is not *longer* retained in the body, but mostly takes the course of the kidneys. Both are equally perspirable in this respect, *viz.* that a person living on either, returning once a day to his usual weight; and if we consider the little nourishment of vegetables, and the great tendency of animal food to corpulency, we must allow that vegetable is more quickly perspired than animal food.

Here I cannot avoid the question so often handled, *Whether man was designed for animal or vegetable food?* This question has been managed unfairly; for in all other animals they take it up as a fact, by observing what the animal chuses; but they tell us man's reason leads him astray. For my part, I conceive little in this argument; for if in those countries where no prejudice of custom prevails, I see people live promiscuously on both, I conclude Nature has designed both for them; and, indeed, when we examine the structure of man's body, his teeth, stomach, and intestines, we find Nature has designed him for a mixed aliment. He has *dentes incisivi & canini* like the carnivorous, and a double row of grinders like the graminivorous. His stomach approaches to that of the carnivorous animals, and his intestines in a middle between both, not so long as the phytovorous, but not so short as the carnivorous animals. But I would trust more to instinct producing practice, abstracted from artificial opinions; and in these cases we find the use of animals and vegetables promiscuously. The Pythagoreans, and their modern imitators, the Brachmans, live on vegetables, merely from prejudice of opinion; and we need not heed those mythologists, who tell us that
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man at first lived on vegetables, as their accounts are not founded on fact. They are opposed by this, that there are many nations still in a crude state, and whom luxury has not yet perverted, who are so far from living on vegetable food, that, from climate, they are obliged to live pretty entirely on animals; and the state of the Hunter and Shepherd is more simple, and more antient, than that of the Farmer or Gardener.

With regard to the effects of these foods on men, I would alledge, there are no persons who live entirely on vegetables; and the Pythagoreans themselves eat milk; and those who do so mostly, as the Pythagoreans above-mentioned, are weakly, sickly, and meagre, labouring under a constant *diarrhæa*, and several other diseases. None of the hardy robust laborious live on these, but chiefly such as gain a livelihood by the exertion of their mental faculties, as in the East Indies, factors and brokers; and this method of life is now confined to the hot-climates, where vegetable diet, without inconvenience, may be carried to great excess. Though it be granted, therefore, that man is intended to live on these different foods promiscuously, yet the vegetable should be in very great proportion. Thus the Laplanders are said to live entirely on animal food; but this is contradicted by the best accounts; for Linnæus says, that besides milk, which they take sour, to obviate the bad effects of animal food, they use also *calla*, *menyanthes*, and many other plants copiously. So there is no instance of any nation living entirely either on vegetable or animal food, though there are indeed some who live particularly on one or other in the greatest proportion. In the cold countries, *e. g.* the inhabitants live chiefly on animal food, on account of the rigour of the season, their smaller perspiration, and little tendency to putrefaction.

Of more importance is the following than the former question, *viz. In what proportion animal and vegetable ought to be mixed?* First, I shall observe, that when I speak of animal or vegetable foods here, I mean those foods given in great proportion. To go on, then;

then ; animal food gives most strength to the system. It is a known aphorism of Sanctorius, that *pondus addit robur*, which may be explained from the impletion of the blood vessels, and giving a proper degree of tension for the performance of strong oscillations. Now animal food not only goes a greater way in supplying fluid, but also gives the fluid more dense and elastic. The art of giving the utmost strength to the system is best understood by those who breed fighting cocks. These people raise the cocks to a certain weight, which must bear a certain proportion to the other parts of the system, and which, at the same time, is so nicely proportioned, as that on losing a few ounces of it, their strength is very considerably impaired. Dr. Robinson, of Dublin, has observed, that the force and weight of the system ought to be determined by the largeness of the heart, and its proportion to the system ; for a large heart will give large blood vessels, while, at the same time, the viscera are less, particularly the liver, which last being encreased in size, a greater quantity of fluid is determined into the cellular texture, and less into the sanguineous system. Hence we see how animal food gives strength, by filling the sanguiferous vessels. What pains we now bestow on cocks, the ancients did on the *Athletæ*, by proper nourishment bringing them to a great degree of strength and agility. It is said that men were at first fed on figs, a proof of which we have said formerly of their nutritious quality ; however, in this respect they were soon found to fall far short of animal food ; and thus we see, that men, in some measure, will work in proportion to the quality of their food. The English labour more than the Scots, and wherever men are exposed to hard labour, their food should be animal. Animal food, although it gives strength, yet loads the body ; and Hippocrates long ago observed, that the athletic habit, by a small encrease, was exposed to the greatest hazards. Hence it is only proper for bodily labours, and entirely improper for mental exercises ; for whoever would keep his mind acute and penetrating, will exceed rather on the side of vegetable food. Even the body is oppressed with animal food ; a full meal always produces dulness, laziness, and yawning ; and hence the feeding of gamesters, whose mind must be ready to
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take advantages, is always performed by avoiding a large quantity of animal food. Farther, with regard to the strength of the body, animal food in the first stage of life is hardly necessary to give strength; in manhood, when we are exposed to active sciences, it is more allowable; and even in the decline of life, some proportion of it is necessary to keep the body in vigour. There are some diseases, which come on at the decay of life, at least aggravated by it; among these I mean the Gout. This, when it is in the system, and does not appear with inflammation in the extremities, has pernicious effects there, attacking the lungs, stomach, head, &c. Now to determine this to the extremities, a large proportion of animal food is necessary, especially as the person is commonly incapable of much exercise.

Animal food, although it gives strength, is yet of many hazards to the system, as it produces plethora and all its consequences. As a stimulus to the stomach and to the whole system, it excites fever, urges the circulation, and promotes perspiration. The system, however, by the repetition of these *stimuli*, is soon worn out; and a man who has early used the athletic diet, is either early carried off by inflammatory diseases, or, if he takes exercise sufficient to render that diet salutary, such an accumulation is made of putrescent fluids, as in his after life lays a foundation of the most inveterate chronic distempers. Therefore it is to be questioned, whether we should desire this high degree of bodily strength, with all the inconveniencies and dangers. Plain it is, that those who are chiefly employed in mental researches, and not exposed to too much bodily labour, should avoid an excess of animal food. There is a disease which seems to require animal food, *viz.* the hysteric or hypochondriac, which to me seems to be very much a-kin to the Gout, affecting the alimentary canal. All people affected with this disease are much disposed to acescency, and I have seen it go so far, that no other vegetable but bread could be taken in, without occasioning the worst consequences. Here then we are obliged to prescribe an animal diet, even to those of very weak organs, for it generally obviates the symptoms. However, I have known several instances.

instances of scurvy in excess produced by a long continued use of this diet, which it is always unlucky to be obliged to prescribe; and when it is absolutely necessary to prescribe, it should be joined with as much of the vegetable as possible, and when a cure is performed, we should gradually recur to that again. If this luxurious age could be persuaded, this disease might be removed with much less danger, by exercise, fresh air, and avoiding warm chambers, venery, and late hours.

Next, let us consider the vegetable diet. The chief inconvenience of this is difficulty of assimilation, which, however, in the vigorous and exercised, will not be liable to occur. In warm climates the assimilation of vegetable aliment is more easy, so that *there* it may be more used, and when joined to exercise gives a pretty tolerable degree of strength and vigour; and though the general rule be in favour of *animal* diet, for giving strength, yet there are many instances of their being remarkably produced from vegetable. Vegetable diet has this advantage, that it whets the appetite, and that we can hardly suffer from a full meal of it. Besides the disorders it is liable to produce in the *primæ viæ*, and its falling short to give strength, I do not know any bad consequences it can produce in the blood vessels, for where there is no instance where its peculiar acrimony was ever carried there, and it is certainly less putrifiable than animal food; nor without the utmost indolence, and a sharp appetite, does it give generally plethora, or any of its consequences; so that we cannot here but conclude, that a large proportion of vegetable food is useful for the generality of mankind.

There is no error in this country more dangerous, or more common, than the neglect of bread; for it is the safest of vegetable aliment, and the best corrector of animal food; and, by a large proportion of this alone, have I obviated its bad consequences, when used in a hypochondriac state. The French apparently have as much animal food on their tables as the Britons, and yet, by a greater use
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of bread, and the dried acid fruits, its bad effects are prevented; and therefore bread should be particularly used by the English, as they are so voracious of animal food. Vegetable food is not only necessary to secure health, but long life; and, as we have said, in infancy and youth we should be confined to it mostly; in manhood, and decay of life, use animal; and, near the end, vegetable again.

There is another question much agitated, viz. *What are the effects of variety in food?* Is it necessary and allowable, or universally hurtful? Variety of a certain kind seems to me necessary, as vegetable and animal foods have their mutual advantages, tending to correct each other. Another variety, which is very proper, is that of liquid and solid food, which should be so managed as to temper each other; and I formerly observed, that liquid food, especially of the vegetable kind, is too ready to pass off before it is properly assimilated, while solid food makes a long stay. But this does not properly belong to the question, whether variety of the same kind is necessary or proper, as in animal foods, beef, fish, fowl, &c. I indeed have never perceived any inconvenience arising from this mixture, or difficulty of assimilation, provided a moderate quantity be taken; when any inconvenience does arise, it probably proceeds from this, that one of the particular substances in the mixture, when taken by itself, would produce the *same effect*; and, indeed, it appears to me, that this effect is not *heightened* by the mixture, but probably *obviated* by it. There are few exceptions to this, if any, e. g. taking a large proportion of acescent substances with milk. The coldness, &c. acidity, flatulency, &c. may appear, and it is possible that the coagulum, from the acescency of the vegetables, being somewhat stronger induced, may give occasion to too long retention in the stomach, and to acidity in too great degree. Again, the mixture of fish and milk often occasions inconveniencies. The theory of this is difficult, though, from universal consent, it must certainly be just. Can we suppose that fish gives occasion to such a coagulum as rennet? If it does so, it may produce the fore-mentioned bad effects. Besides, fish approach

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somewhat to vegetables, in giving little stimulus, and are accused of the same bad effects as these, *viz.* bringing on the cold fit of fever.

Thus much may be said for variety : But it also has its disadvantages, provoking to gluttony; this, and the art of cookery, making men take in more than they properly can digest; and hence, perhaps very justly, Physicians have universally almost preferred simplicity of diet; for, in spite of rules, man's eating will only be measured by his appetite, and satiety is sooner produced by *one* than by *many* substances. But this is so far from being an argument against variety, that it is one for it, as the only way of avoiding a full meal of animal food, and its bad effects, is by presenting a quantity of vegetables. Another mean of preventing the bad effects of animal food, is to take a large proportion of liquid; and it is on that account the bad effects of animal food are not so much felt here, on account of our drinking much with it, and using broths, which are at once excellent correctors of animal food, and preventors of gluttony.

Having now finished what we had to say on animal food in general, and discussed several comparisons and questions which arose on that subject, I now come to the particular substances mentioned in the Catalogue.

M I L K.

Of the foods taken from animals, I chuse to begin with milk, as it is a connecting and intermediate substance between animals and vegetables. I do not find it proper to enter just now into a minute chemical investigation of this subject, especially as you will soon have an opportunity of seeing that subject more fully treated than I can do here*. Milk seems immediately to be secreted from the chyle, both being a white liquor of the same consistence: It is most copiously secreted after meals, and of acescent nature. In most animals who live on vegetables, the milk is acescent, and it is

* The Author here refers to a very ingenious Thesis, published about that time, on the subject of Milk — *De Lacte*.

uncertain, though at the same time no observation proves the contrary, whether it is not so likewise in carnivorous animals. If it really be found of this nature it will solve the question about the decomposition and acescency of the food of these last mentioned animals in the *primæ viæ*. But whatever be in this, it is certain, that the milk of all animals, who live on vegetables, is acscent. Milk being derived from the chyle, we thence conclude its vegetable nature, for in those who live on both promiscuously, more milk is got, and more quickly, from the vegetable than the animal food. Milk, however, is not purely vegetable, though we have a vegetable liquor that resembles its taste, consistence, colour, acescency, and the separability of the oily part, I mean an emulsion of the *nucis oleosæ* and farinaceous substances. But these want the coagulable part of milk, which seems to be of animal nature, approaching to that of the coagulable lymph of the blood. Milk, then, seems to be of an intermediate nature, between chyle taken up from the intestines, and their albumen, or fully elaborated animal fluid.

Its contents are of three kinds; first, an oily part, which, whatever may be said concerning the origin of other oils in the body, is certainly immediately derived from the oil of the vegetables taken in, as with these it agrees very exactly in its nature, and would entirely, if we could separate it fully from the coagulable part. Another mark of their agreement is the separability, which proves that the mixture has been lately attempted, but not fully performed. 2dly, Besides this oily, I have told you there is a proper coagulable part; and, 3dly, much water accompanies both, in which there is dissolved a saline saccharine substance. These three can be got separate in cheese, butter, and whey, but never perfectly so, a part of each being always blended with every other part.

Nothing is more common, from what has been said of its intermediate nature, than to suppose that it requires no assimilation, and hence has been deduced the reason of its exhibition in the

most weakly state of the human body. But wherever we can examine milk we always find that it coagulates, suffers a decomposition, and becomes aced. Again, infants, who feed entirely on milk, are always troubled with eructations, which every body observes are not of the same quality with the food taken, and therefore I would alledge, that, like all other food, milk turns naturally aced in the stomach, and only appears in the chyle and blood, in consequence of a new recombination. It approaches then to the nature of vegetable aliment, but is not capable of its noxious vinous fermentation, and therefore has an advantage over it; neither from this quality, like animal food, is it heating in the stomach, and productive of fever, though at the same time, from its quantity of coagulable matter, it is more nourishing than vegetables.

These are the general qualities of milk; now let us consider these as applicable to food. Milk is the food most universally suited to all ages and states of the body, but it seems chiefly designed by Nature as the food of infants. When animals are in the foetus state, their solids are a perfect jelly, incapable of an assimilatory power. In such state Nature has perfectly assimilated food, as the *albumen ovi* in the oviparous, and in the viviparous animals certainly somewhat of the same kind, as it was necessary the vessels should be filled with such a fluid as would make way for an after assimilation. When the infant has attained a considerable degree of firmness, as when it is separated from the mother, yet such a degree of weakness still remains, as makes somewhat of the same indication necessary. It behoves the infant to have an alkalescent food ready prepared, and at the same time its noxious tendency to be avoided. Milk then is given, which is alkalescent, and, at the same time, has a sufficient quantity of acidity to correct that alkalescence. As the body advances in growth, and the alkalescent tendency is greater, the animal, to obviate that tendency, is led to take vegetable food, as more suited to its strength of assimilation.

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I observed, that milk was almost suited to all temperaments, and it is even so to stomachs disposed to acescency, more than those substances which have undergone the vinous fermentation; nay, it even checks vinous fermentation, curing the heart-burn, and precipitating the lees, when, by renewal of fermentation, the wine happens to be fouled. It therefore very properly accompanies a great deal of vegetable aliment, although sometimes its acescency is troublesome, either from a large proportion taken in, or from the degree of it; for according to certain unaccountable circumstances, different acids are formed in the stomach, in a healthy body a mild one; in the hypochondriac disease, *e. g.* one sometimes as corrosive as the fossil acids. When the acidity of milk is carried to a great degree, it may prove remarkably refrigerant, and occasion cold crudities, and the recurrence of intermittent fevers. To take the common notion of its passing, unchanged, into the blood, it can suffer no solution. But if, with me, you admit its *coagulum* in the stomach, then it may be reckoned among soluble or insoluble foods, according as that *coagulum* is more or less tenacious. Formerly rennet, which is employed to coagulate milk, was thought an acid, but, from late observations, it appears that, if it be an acid, it is very different from other acids, and that its *coagulum* is stronger than that produced by acids. It has been imagined that a rennet is to be found in the stomachs of all animals, which causes coagulation of milk; but to me the coagulation of milk seems to be owing to a weak acid in the stomach, the reliëts of our vegetable food inducing, in healthy persons, a weak and soluble *coagulum*; but in different stomachs this may be very different, in these becoming heavy and less soluble food, and sometimes even evacuated in a coagulated undissolved state, both by stomach and stool.

As milk is acescent, it may be rendered sometimes purgative by mixing with the bile; and I know some examples of this. More commonly, however, it is reckoned among those foods which occasion costiveness.

Hoffman,

Hoffman, in his Experiments on Milk, found, that all kinds of it contained much water, and when this was dissipated, found the residuum very different in their solubility. But we must not thence conclude, that the same insolubility takes place in the stomach, for extracts made from vegetables with water are often very insoluble substances, and hardly diffusible through water itself; therefore in Hoffman's extracts, if I may so call them, of milk, somewhat of the same kind might have appeared, and these substances, which in their natural state were not so, might appear very insoluble. However, we may allow that milk is always somehow insoluble in the intestines, as it is of a drying nature, and, as cheese, &c. is very costive. And this effect, I think, shows that milk is always coagulated in the stomach; for if it remained fluid no fæces would be produced, whereas sometimes very hard ones are observed. In the blood vessels, from its animal nature, it may be considered as nutritious; but when we consider its vegetable contents, and acescency in the *primæ viæ*, we find that, like animal food, it does not excite that degree of fever in the time of digestion, and that from its acescency it will resist putrefaction. Hence is the foundation of its use in hectic fevers, which, whatever be their cause, appear only to be exacerbations of natural feverish paroxysms, which occur twice every day, commonly after meals, and at night. To obviate these, therefore, we give such an aliment as produces the least exacerbation of these fevers; such is milk, on account of its acescent vegetable nature.

There appears also somewhat peculiar in milk, which requires only a small exertion of the animal powers in order to its assimilation; and besides, in hectic complaints there is wanted an oily, bland food, approaching to the animal nature, so that on all these accounts, milk is a diet peculiarly adapted to them, and, in general, to most convalescents, and to those of inflammatory temperaments. There is a certain disease whose proper salutary form is that of inflammation, I mean the Gout. There is no method of curing, I had rather say preventing this, but by avoiding this inflammatory tendency

tendency by a proper regulation of diet. The inflammatory form, which I said was the salutary one, is also attended with a weakness of the nerves, so that in our prevention we should not weaken the system too much, as would be done by vegetables, and therefore milk may be employed with advantage. However, it may be a question how far, and in what cases, we ought even to obviate the gout, which is often a constitutional disease, and has taken deep root in the system, and if prevented in its native inflammatory form, will often be so by weakening too much, and so will appear in other more pernicious ones. But there can be no objection against attempting this by milk. However, that attempt ought not be made but very early in life, and then, if this diet be used with proper exercise, temperance, and avoiding of venery, there may be expectations of success; for in the decline of life, after one has been used to high living, this low diet is often attended with pernicious consequences. So far of milk in general. We shall now speak of the particular kinds mentioned in the Catalogue, and which are in common use. I have set them down in the proportion of their solid contents.

The three first agree very much in their qualities, being very dilute, having little solid contents, and, when evaporated to dryness, having these very soluble, containing much saccharine matter, of a very ready acescency, and when coagulated, their *coagulum* being tender, and easily broke down. From this view you see they have less oil, and less coagulable matter than the rest.

The three last agree, in opposite qualities, to the three mentioned; but here there is somewhat more of gradation. Cow's milk comes nearest to the former milks: Goats milk is less fluid, less sweet, less flatulent, has the largest proportion of insoluble part after coagulation, and indeed the largest proportion of coagulable part; its oily and coagulable part are not spontaneously separable, never throwing out a cream, or allowing butter to be readily extracted from it. Hence the virtues of these milks are obvious,
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being more nourishing, though, at the same time, less easily soluble in weak stomachs, than the three first, less acedent than these, and so more rarely laxative, and peculiarly fitted for the diet of convalescents without fever. The three first, again, are less nourishing, more soluble, more laxative as more acedent, and adapted to the convalescents with fever.

These qualities, in particular milks, are considerably diversified by different circumstances. First, Different animals, living on the same diet, give a considerably different milk; for there seems to be something in the constitution, abstracting from the aliment, which constitutes a considerable diversity of milk, not only in the same species of animals, but also in the same animal, at different ages, and at different distances after delivery: This, you will easily perceive, applies to the choice of nurses. Secondly, Milk follows the nature of the aliment more than any other juice in the human body, being more or less fluid and dilute, more or less solid and nourishing, in proportion as these qualities are more or less in the aliment. (*a*) The nature of the aliment differs according to its time of growth, *e. g.* old grass being always found more nourishing than young. (*b*) Aliment, too, is always varied according to the season, as that is warm or dry, moist or cloudy.

The milk of each particular kind of animal is fitter for particular purposes, when fed on proper food. Thus the cow delights in the succulent herbage of the vale: If the sheep be fed there he certainly rots, but on the higher and more dry side of the mountain he feeds pleasantly and healthily; while the goat never stops near the bottom, but ascends to the craggy summit: And certainly the milks of these animals are always best on their proper soil, and that of goats is best on a mountainous country. From a dissertation of Linnæus, we have many observations concerning the diversity of plants on which each animal chuses to feed. All the Swedish plants, which could be collected together, were presented alternately to domestic animals, and then it appeared that the goat
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lived on the greatest variety, and even on many which were poisonous to the rest; that the cow chose the first succulent shoots of the plant, and neglected the fructification, which last was preferred by the goat. Hence may be deduced rules concerning the pasturage of different animals; *e. g.* Farmers find that, in a pasture which was only fit to feed a certain number of sheep, an equal number of goats may be introduced, while the sheep are no less nourished than before.

RULES of the COOKERY of MILK.

It is not easy to assign the difference between milk fresh drawn and that detained in the open air for some time, but certainly there is some material one, otherwise nature universally would not have directed infants to sucking; and indeed it seems, better than the other, fitted for digestion and nourishment. Physicians have supposed that this depended on the evaporation of some *spt. rector.* but indeed I cannot conceive any such, except common water here; and besides, these volatile parts can hardly be nutritious. A more plausible account seems deducible from mixture: Milk, new drawn, has been but lately mixed, and is exposed to spontaneous separation, a circumstance hurtful to digestion, none of the parts being, by themselves, so easily assimilated as when they are all taken together. Hence, then, milk new drawn is more intimately blended, and therefore then is most proper to the weakly and infants.

Another difference in the use of milk exposed for some time to the air, is taking it boiled or unboiled. Physicians have generally recommended the former, but the reason is not easily assigned. Perhaps the reason is this, Milk kept for some time exposed to the air has gone so far to a spontaneous separation; whereas the heat thoroughly blends the whole, and hence its resolution is not so easy in the stomach; and thus boiled milk is more costive than raw, and gives more fæces. Again, when milk is boiled, a considerable quantity of air is detached, as appears from the froth on the surface, and air is the chief instrument of fermentation in

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bodies,

bodies, so that, after this process, it is not liable to acescency; for these reasons it is proper for the robust and vigorous.

Another difference of milk is, according as it is fluid or coagulated. The coagulated is of two kinds, as induced by rennet, or the natural acescency of the milk. The former preparation makes the firmer and less easily soluble *coagulum*, though, when taken with the whey unseparated, it is less difficult of solution, though more so than any other *coagulum* in the same case. Many nations use the latter form, which is easier soluble, but very much acescent, and therefore, in point of solution, should be confined to the vigorous, in point of acescency, to those who live on alkalescent food; and in the last case the Laplanders use it as their chief acescent condiment. From the same considerations it is more cooling, and in its other effects like all other acescent vegetables.

We now come to the examination of the parts into which milk separates; and first, with regard to the

C O A G U L A B L E P A R T.

This we use at all different ages, from fresh cured to old cheese. The whole of this is chiefly animal; hence it is the most nutritive part, and much the most insoluble, and hence gives most faeces, and therefore the common notion of cheese's costiveness is just. So far of cheese in general. It differs in proportion to the quantity of oily parts natural or addition in the coagulable part. The more rich oily parts there are in cheese, the more it is nutritive and soluble, lean cheese being among the most insoluble aliments. Cheese is liable to rancidity and putrefaction, and then we must consider it as having all the effects of animal food the farther advanced to putrefaction; at this time it ceases to be nutritive, and is only to be considered as a fit condiment for vegetable food. In general, cheese, as an aliment, is only fit for the laborious and robust.

O I L Y

O I L Y P A R T.

We use this, in consequence of its immediate spontaneous separation, in the state of cream. This is liable to acidity and rancidity, on both which accounts it is of difficult mixture and digestion in the stomach, and I do not know but all the bad effects of milk may be imputed to cream, the quarter part of which is not pure oil, and the rest coagulable and saline parts. In the form of butter the oil is much more pure, and then may be used with advantage in diet: I have mentioned it as a strong nutriment, fit to accompany our vegetable diet, especially to the leaner *farinacea*, in order to give them, in some measure, the qualities of the rich *nucis oleosæ*. Butter is more rancescent than olive oil, but as that cannot be had here, either pure or fresh, we use our own butter with greater propriety.

W A T E R Y S A L I N O - S A C C H A R I N E P A R T.

This will be different, according as the milk has been coagulated by rennet, or its own acescency. By rennet, the coagulable part is more purely separated, and a proportion of oil goes along with the whey; but when the milk is coagulated by its own souring, the watery part is almost purely acid, and seldom used. The whey contains much saccharine part, and so is more acescent than entire milk, and has even been said to be capable of vinous fermentation: Certainly it approaches nearer to it than milk itself, and hence is more capable of a noxious acescency, and hence is more purgative and flatulent than milk. Of all ingredients in milk, there is a great proportion which goes along with the whey, and therefore it will be a nutritious substance, though at first sight, as that was supposed to be separated, it might seem otherwise. Different milks yield wheys of different qualities; cows milk allows its oil to be separated in greatest proportion in the whey, sheep less, and goat not at all. In some measure the whey follows the nature of the milk; goats whey is more nutritious, and may be substituted for womens, asses, and mares, in hectic cases, &c. Goats whey is

a medicine of great use in many cases, and perhaps its advantages are improved by the necessary reparation to mountainous countries to obtain it, not only because it is there more perfect, but also because of the change of the smoaky city air into light and salubrious. By taking these substances in the form of whey, there is introduced into the habit a bland, easily assimilated nourishment, passing off easily by the secretions, and soon changing the state of the fluids. If it were not for regard to the state of the stomach, liquid food would often be employed with advantage, as, in many cases, encrease of fluidity gives encrease of nourishment; and thus a calf is more effectually nourished by diluting its milk with equal quantity of water, than if the milk were given alone. Quite analagous to this is the taking in this bland and mild nourishment in form of whey, especially from the richer milk.

B U T T E R M I L K.

Here the whey and coagulable part are more entirely separated from the oily, but the coagulable part in butter milk is broke down, resolved, and of easy digestion. As it is very saccharine it is very nutritious, but not without acidity, and therefore is more cooling to the system, and more suited to the inflammatory and alkalescent diathesis, than milk, but for the same reason it is noxious where refrigeration is hurtful.

Condiments of milk, as liable to acescency and cooling in particular constitutions. Where this tendency is apprehended, it may be accompanied with some of the *aromata*, and cream and whey are there often attended with advantage if used with these. Sugar is another condiment. If milk is liable to acescency, this would seem to encrease it, and indeed it does so in stomachs so disposed. But sugar has another effect, *viz.* preventing the spontaneous separation of milk, and therefore has many of the advantages of newly drawn milk. It is proper, therefore, to give sugar along with milk to convalescents. Conserve of roses is often employed,
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and acts only by its sugar, two-thirds of it being such; and honey itself, the most acescent of all the sweets, is often employed with advantage.

Having now finished what we had to say on Milk, the intermediate substance between Animal and Vegetable, we now come to

A N I M A L F O O D, strictly so called.

The first difference of animal food regards its solubility, depending on a lax or firm texture of its different kinds. Solubility of animal food seems to deserve less attention than is commonly imagined; for I have known persons of a weak stomach incapable of breaking down the texture of vegetables, or even of dissolving a light pudding, to whom hung beef, or a piece of ham, was very grateful, and easily digested. None of the theories given for the solution of animal food in the human stomach seem to me sufficiently to have explained that process. Long ago has been discarded the supposition of an active corrosive menstruum there, and also the doctrine of trituration, for which, indeed, there seems no mechanism in the human body; and we now commonly agree with Boerhaave, supposing nothing more necessary than a watery menstruum, moderate heat, and frequent agitation. This will account for solution in some cases, but not entirely. Let us try to imitate it out of the body with the same circumstances, and in ten times the time in which the food is dissolved in the stomach, we shall not be able to bring about the same changes. Take the coagulated white of an egg, which almost every body can easily digest, and yet no artifice shall be able to dissolve it. Hence then we are led to seek another cause for solution, *viz.* fermentation; a notion, indeed, formerly embraced, but, on the introduction of mechanical philosophy, industriously banished, with every other supposition of that process taking place at all in the animal œconomy.

Many of the Ancients imagined this fermentation to be putrefactive; but this we deny, as an acid is produced; though hence
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the fermentation might be reckoned the vinous, which, however, I have formerly proved to you to be morbid. Neither, indeed, is the fermentation purely acetous, but modified by putrescents; for Pringle has observed, that animal matters raise and even expedite the acetous process. The fermentation, then, in the stomach is of a mixed nature, between the acetous and putrefactive, mutually modifying each other; though, indeed, in the intestines, somewhat of the putrefactive seems to take place, as may be observed from the state of the *feces* broke down, and from the little disposition of such substances to be so, which are not liable to the putrefactive process, as the firmer parts of vegetables, &c. Upon this view solution seems to be extremely easy, and those substances to be most easily broke down which are most subject to putrefaction.

But solution also depends on other circumstances, and hence requires a more particular regard. First, there is a difference of solubility with respect to the manducation of animal food, for which bread is extremely necessary, in order to keep the more slippery parts in the mouth till they be properly comminuted. From want of proper manducation I have known many persons subject to eructations, and this more frequently from the firm vegetable foods than from the animal, as apples, almonds, &c. though, indeed, even from animal food, very tendinous, or swallowed in unbroken masses, such sometimes occur. Manducation is so much connected with solution, that some, from imperfectly performing that, are obliged to belch up their food, remanducate it, and swallow it again before the stomach can dissolve it, or proper nourishment be extracted. Another proof of our regard to solubility, is our rejecting the firmer parts of animal food, as bull beef, and generally carnivorous animals.

Its effects with regard to solubility I also take, secondly, to be the foundation of our choice between *fat* and *lean*, *young* and *old meats*. In the *lean*, although, perhaps, a single fibre might be sufficiently tender, yet these, when collected in *fasciculi*, are very firm
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and compact, and of difficult solution; whereas in the *fat* there is a greater number of vessels, a greater quantity of juice, more interposition of cellular substance, and consequently more solubility. Again, in young animals, in my opinion, there is the same number of fibres as in the older, but these more connected; whereas, in the older, the growth depending on the separation of these, and the encrease of vessels and cellular substance, the texture is less firm and more soluble, which qualities, with regard to the stomach, are at that time too encreased, by the encreased alkalescency of the animal. To this also may be referred our choice of castrated animals, *viz.* on their disposition to fatten after the operation.

3. It is with a view to the solubility, that we make a choice between meats recently killed, and those which have been kept for some time. As soon as meat is killed the putrefactive process begins, which commonly we allow to proceed for a little, as that process is the most effectual breaker down of animal matters, and a great assistance to solution. The length of time during which meat ought to be kept, is proportioned to the meat's tendency to undergo the putrid fermentation, and the degree of those circumstances which favour it: Thus in the Torrid Zone, where meat cannot be kept above four or five hours, it is used much more recent than in these northern climates.

4. *Boiled* or *roasted* meats create a difference of solution. By boiling we extract the juices interposed between the fibres, approximate them more to each other, and render them of more difficult solubility, which is encreased too by the extraction of the juices, which are much more alkalescent than the fibres; but when we want to avoid the stimulus of alkalescent food, and the quick solution, as in some cases of disease, the roasted is not to be chosen. Of roasted meat, it may be asked whether are more proper, those which are most or least roasted. That which is least done is certainly the most soluble; even raw meats are more soluble than dressed, as I know from a person who from necessity was obliged,
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for some time, to eat such : But at the same time that meats little done are very soluble, they are very alkalescent ; so that, wherever we want to avoid alkalescence in the *primæ viæ*, the most roasted meats should be chosen. Those who throw away the broths of boiled meat do very improperly ; for, besides their supplying a fluid, (as I formerly observed,) from their greater alkalescence they increase the solubility of the meat. Here we shall observe, that pure blood has been thought insoluble ; undoubtedly it is very nutritious, and though out of the body, like the white of eggs, it seems very insoluble, yet, like that too, *in* the body it is commonly easily digested. Moses very properly forbid it the Israelites, as, in warm countries, it is highly alkalescent, and even here, when it was used in great quantity, the scurvy was more frequent ; but to a moderate use of it, in these climates, no such objection takes place.

5. Solubility is varied from another source, *viz.* viscosity of the juice of aliment. Young animals, then, appear more soluble than old, not only on account of their compaction and firmness of texture, but also on their greater viscosity of juice. See Dr. Brian Robinson, of Dublin, on this head. And nothing is more common, as we observed, than to be longer oppressed from a full meal of veal, than from the same quantity of beef, &c. Upon account too of their greater viscosity of juice, are the tendinous and ligamentous parts of animals longer retained than the purely muscular, as well as on account of their firmness of texture. Even fishes, whose muscular parts are exceedingly tender, are, on account of their gluey viscosity, longer of solution in the stomach. And eggs, too, which are exceedingly nourishing, have the same effect, and cannot be taken in great quantity : For the stomach is peculiarly sensible to gelatinous substances, and by this means has Nature perhaps taught us, as it were by a sort of instinct, to limit ourselves in the quantity of such nutritive substances.

6. With regard to solution, we must take in the oils of animal food, which, when tolerably pure, are the least putrescent part of it,

it, and by diminishing the cohesion of the fibres, render them more soluble. On this last account is the lean of fat meat more easily dissolved than other lean. But when the meat is exposed to much heat, this oil is separated, leaving the solid parts less easily soluble, and becoming itself empyreumatic, rancescent, and of difficult mixture in the stomach. Fried meats, from the reasons now given, and baked meats, for the same, as well as the tenacity of the paste, are preparations which diminish the solubility of the food. From what has been said, the preparation of food by fattening it, and keeping it for some time after killed, although it may administer to gluttony, will yet, it must be confessed, encrease the solution of the food.

The second difference of animal food is with regard to

A L K A L E S C E N C Y.

Of this we have taken a little notice already under the first head of Solubility.

First, From the too great alkalescency we commonly avoid the carnivorous animal, and the *feræ*, and chuse rather the granivorous. Some birds, indeed, which live on insects, are admitted into our food; but no man, without *nausea*, can live long upon these alone, for any length of time. Fishes, too, are an exception to this rule, living almost universally on each other. But in these the alkalescency does not proceed so far; whether from the viscosity of their juice, their want of heat, or some peculiarity in their œconomy, I will not pretend to determine.

Secondly, Alkalescency is determined by difference of age. The older animals are always more alkalescent than the young, from their continual progress to putrefaction. Perhaps this may depend on the nourishment of the younger animals, milk, vegetables, &c. Homberg always found, in his endeavours to extract an acid from

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human blood, that more was obtained from the young than from the old animals.

A third circumstance which varies the alkalescency of the food, is the wildness or tameness of the animal; and this again seems to depend on its exercise. I knew a Gentleman who was fond of cats for food, but he always used to feed them on vegetable food, and keep them from exercise; and in the same manner did the Romans rear up their rats, when intended for food. In the same way the flesh of the partridge and hen seems to be much the same; only, from its being more on the wing, the one is more alkalescent than the other. Again, tame animals are commonly used without their blood, whereas the wild are commonly killed in their blood, and upon that account, as well as their greater exercise, are more alkalescent.

Fourthly, The alkalescency of food may be determined from the quantity of volatile salt it affords. The older the meat is, it is found to give the greater proportion of volatile salt.

Fifthly, The alkalescency of aliment may also, in some measure, be determined from its colour, the younger animals being whiter and less alkalescent. We also take a mark from the colour of the gravy poured out, according to the redness of the juices judging of the animal's alkalescency.

Lastly, The relish of food is found to depend much on its alkalescency, as also the stimulus it gives and the fever it produces in the system. These effects are also complicated with the viscosity of the food, by which means it is longer detained in the stomach, and the want of alkalescency supplied.

Having mentioned Animal Food as differing in solubility and alkalescency, which often go together in the same subject, we come to the third difference, *viz.*

QUAN-

Q U A N T I T Y of N U T R I M E N T,

Which is either absolute or relative; absolute with respect to the quantity it really contains, sufficient powers being given to extract it; relative, with respect to the assimilatory powers of those who use it. The absolute nutriment is of some consequence, but the relative in the robust and healthy, and except in cases of extraordinary weakness, may, without much inconvenience, be disregarded. In another case is the quantity of nourishment relative, *viz.* with regard to its *perspirability*; for if the food is soon carried off by the excretions, it is the same thing as if it contained a less proportion of nourishment. For, giving more fluid, that which is longer retained affords most, and for the repair of the solids, that retention also is of advantage. Now gelatinous substances are long retained, and are, besides, animal substances themselves, dissolved so, that, both absolutely and relatively, such substances are nutritious. Of this kind are eggs, shell fish, &c. In adults, though it is disputed whether their solids need any repair, yet at any rate, at this period, fluid is more required; for this purpose the alkalescent foods are most proper, being most easily dissolved. They are, at the same time, the most perspirable; on one hand that alkalescency leading to disease, while on the other their perspirability obviates it. Adults, therefore, as Writers justly observe, are better nourished on the alkalescent; the young and growing, on gelatinous foods. All this leads to a comparison of young and old meats, the first being more gelatinous, and the last more alkalescent. This, however, by experience, is not yet properly ascertained. Mr. Geoffroy is the only person I know who has been taken up with the analysis of foods. See *Memoirs de l'Academie l'an 1731 & 1732*. His attempt was certainly laudable, and in some respects usefully performed, but in general his experiments are not sufficiently repeated, nor, indeed, sufficiently accurate; and I would refuse that beef and veal have been properly examined, for he has not been on his guard against the various circumstances which affect meats; the cow kind liking a moist

succulent herbage, which is not to be got in warm climates; while the sheep are fond of a dry food, and thrive best there. Again, some of his experiments seem contradictory. He says, that veal gives more solution than beef, while lamb gives less than mutton; which, I confess, is much to be doubted. If both he and Sanctorius had examined English beef, the result, probably, would have been very different as to its perspirability, &c. Besides, Mr. Geoffroy has only analysed beef and veal when raw, has made no proper circumstantial comparisons between quadrupeds and birds, and has examined these last along with their bones, and not their muscles, &c. by themselves, as he ought to have done, &c. If a set of experiments of this kind were properly and accurately performed, they might be of great use; but at present, for the purpose of determining our present subject, we must have recourse to our alkalescency, solubility, &c.

The fourth difference of animal foods is

The NATURE of the FLUIDS they afford.

The whole of this will, I think, be understood, from what has been said on alkalescency, the fluid produced being more or less dense and stimulating, in proportion as that prevails.

The fifth difference of animal foods is with respect to their

PERSPIRABILITY.

The sum of what I have to say on this matter is this, that such foods as promote an accumulation of fluid in our vessels, and dispose to plethora, are the least perspirable; and commonly give most strength; that the more alkalescent foods are the most perspirable, though the viscid and less alkalescent may attain the same property by long retention in the system. The authors on Perspirability have determined the Perspiration of Foods as imperfectly as Mr. Geoffroy has done the Solubility, and in a few cases only. We must

must not lay hold on what Sanctorius has said on the perspirability of mutton, because he has not examined, in the same way, other meats in their perfect state ; far less on what Keil says of oysters, as he himself was a valetudinarian, and consequently an unfit subject for such experiments, and probably of a peculiar temperament.

Having now finished the examination of Animal Food in general, we come to the consideration of particular Animals, of which much cannot be expected to be said, after we have so fully delivered our general principles.

Animals are divided into six classes, the *Quadrupedia*, *Aves*, *Amphibia*, *Pisces*, *Insecta*, *Vermes*. In my Catalogue I have entirely omitted the *Amphibia*, but shall supply them in their proper place. The advantages of this division will be known to any one who consults the first volume of Linnæus's great *Systema Naturæ*. That it should often contradict common language, is not to be wondered at, since that arose from a gross superficial view of things. Linnæus, for the term *Quadrupedia*, now uses that of *Mammalia*, on account of the former excluding the cetaceous fishes, which, although they have not four feet, have yet the other distinguishing properties of the *Quadrupedia*, an heart with two auricles and two ventricles, lungs with which they breathe alternately, *penis intrans*, and, besides, are viviparous and lactiferous, &c.

This class is subdivided into different orders, and it seems doubtful whether any of them are rejected from our food, esculent animals, (if I may say so,) in different countries, being taken from every one of them. The *Pecora* are the order chiefly used here, and are distinguished by being hoofed, ruminant animals, phytovorous, domestic, tame, and generally horned. These, from living on vegetables, are perhaps the most proper food, and also from their being tame and domestic. Of the *Pecora*, those more commonly in use are the cow, sheep, goat, and deer or hart. In other countries

countries the rest may be used, as the camel in Africa; and if the musk-deer be taken in, we have then the whole order.

COW KIND; BEEF, VEAL.

This we use as others, in two different ways, *young* and *old*. Beef, compared with mutton, is of a more firm texture, and less soluble, but I am persuaded is equally alkalescent, perspirable, and nutritious: If, in the southern countries, it is not esteemed so, it is on account of its imperfection there, as already observed. With regard to young and old foods, a great deal has been already said: I shall confirm that here, with an observation on our use of *veal*. If we were purely to consider tenderness of texture, the youngest animals certainly would always be preferred; but you observe, that we use veal at a certain age, and perhaps the reason of it may be this; when an animal is very young, although its fibres, taken by themselves, are more tender, yet, on account of their great connection and complication, they are less soluble; whereas, in the space of a month or two, by proper nourishment, the fibres come to be more and more separated, a greater quantity of cellular substance is interposed, and they are rendered more soluble and nutritious: Now, after this period, perhaps after the third month, the animal's nature tends towards robustness, firmness, and rigidity, becoming more fibrous again, and more difficultly dissolved. When an animal is very young, we commonly have an aversion to it; the whole of it then is, as it were, a semifluid mass, which we cannot take in sufficient quantity, and which, from its watery consistence, must be but little nutritious.

SHEEP KIND; MUTTON, LAMB.

Mutton has commonly been preferred to all the fleshes of quadrupeds, and indeed, besides its being more perfect, has the advantage over them of being more generally suited to different climates; whereas beef, *e. g.* requires a very nice intermediate state,
which

which it seems to enjoy chiefly in England; for although we supply what are reckoned the best cattle, it is in their rich pastures they are brought to perfection. Now the sheep can be brought to almost the same perfection in this bleak northern, as in the mild southern countries. With regard to the difference between the young and old of this kind, the same observations occur as under the former head. Lamb appears a more fibrous meat, and, upon that account, is less easily soluble than veal. In this country, house-lamb is never reared to advantage.

GOATS FLESH; KID.

The goat, from its own nature, and from its exercise in quest of food, is of a firm fibrous texture, and, with all the advantages art can give it, of very difficult solution, and so disused in those countries where delicacy of food is introduced. Kid, from its natural rigidity, and the little care bestowed on its feeding, has all the disadvantages of any young food in excess.

HART, CERVUS; VENISON.

Cervus dama, or fallow deer, is that with which we are best acquainted, and use most, known under the name of Venison. This, from the nature of its œconomy, from its wild and exercised state, and from being generally killed in the blood, is an alkalescent sapid aliment, considered as a very great delicacy, and, though an exercised animal, of easy digestion. Its flesh approaches very near to that of the sheep, though undoubtedly it is more sapid and alkalescent.

The stag, or red deer, is another of the same kind, sometimes used in food, and is a more intractable, robust, and exercised animal than the other, and consequently more insoluble. Perhaps there are others of the *Cervus* kind used in food, but I am not yet properly acquainted with them.

After

After the *Pecora* is set down in the Catalogue, after some interval, the term *Lepus*, one of the *genera* of the *Mammalia Glires* of Linnæus, comprehending the hare and rabbit, which, although their specific difference be small, yet differ a good deal in qualities as food.

H A R E.

This animal is much exercised, and thereby acquires a great firmness of fibres; and, though sufficiently alkalescent, and killed in the blood, is yet of difficult solubility. As the tenderness of meats depends on the succulency of the muscular parts, the hare killed after a long chase, when much of the oil of the body is absorbed, is much firmer and tougher than when killed in the seat.

R A B B I T.

This animal is of very little exercise, moderately alkalescent, and one of the white meats without viscidities. Whether on these accounts, or some particulars in its œconomy, I have always found it one of the lightest and most soluble animal foods.

Next *Lepus*, in the Catalogue, is placed the term, *Sus*, Hog.

H O G; P O R K.

This animal is of a peculiar make, and difficultly reduced to any particular order, placed, however, among the *Mammalia Bestiæ* of Linnæus. It is the only domestic animal that I know, of no use to man when alive, and therefore properly designed for food. Besides, as loathsome and ugly to every human eye, it is killed without reluctance. The Pythagoreans, whether to preserve health, or on account of compassion, generally forbid the use of animal food, and yet it is alledged that Pythagoras reserved the use of hogs flesh for himself. The Jews, the Egyptians, &c. and others in the warm countries, and all the Mahometans at present, reject the use of pork. It is difficult to find out the reason of this,

or

or of the precept given to some of them, though commonly such are not given without a particular one. The Greeks gave great commendations to this food; and Galen, though indeed that is suspected to be from a particular fondness, is every where full of it. The Romans considered it as one of their delicacies; and if some of the inhabitants of the northern climates have taken an aversion to it, that probably arose from the uncultivated state of their country not being able to rear it. Pork is of a very tender structure, encreased perhaps from a peculiarity in its œconomy, *viz.* taking on fat more readily than any other animal. Pork is a white meat even in its adult state, and then gives out a jelly in very great quantity. On account of its little perspirability and tenderness, it is very nutritious, and was given for that intention to the *athletæ*. With regard to its alkalescency, no proper experiments have yet been made, but as it is of a gelatinous and succulent nature, it is probably less so than many others. Upon the whole, it appears to me, who am unprejudiced in its favour, to be a very valuable nutriment, and I really do not understand why it was in some countries forbid. It is said that this animal is very apt to be diseased; but why were not inconveniencies felt on that account in Greece? Again, it has been alledged, that as Palestine would not rear these animals, and as the Jews had learned the use of them in Egypt, it was necessary they should have a precept to avoid them. But the Egyptians themselves did not use this meat, and this religious precept, indeed, as well as many others, seems to have been borrowed from them. Possibly, as pork is not very perspirable, it might encrease the leprosy, which was said to be epidemic in Palestine: But this is far from being certain; and though a good purpose, as I have said, is commonly intended by such general precepts, yet they often take their rise from the particular prejudice or caprice of legislators.

Many others of the *Mammalia*, or Quadrupeds, are used in different countries, and it is not certain which of the Quadrupeds may be excepted from the rule. Thus the Tartars eat horses, the
S Romans

Romans eat asses, dogs, rats, &c. but of these, as we have no experience, little can be said, though their qualities may probably be understood from the principles already delivered.

We now come to consider the Class of BIRDS, which is divided into six orders, *Accipitres*, *Picæ*, *Anseres*, *Grallæ*, *Gallinæ*, and *Passeres*. The *Accipitres* and *Picæ* are carnivorous Birds, and not used by us, or indeed much by any nation in food. The other four are what are chiefly used, of which we have begun with the *Gallinæ*, as the chief of our domestic fowl; and of these the first, viz. *Gallus Gallinaceus*, is comprehended by Linnæus, under the general name of *Pheasianus*.

The COCK, HEN, CHICKEN, and CAPON,

are entirely domestic animals, there being no country, as far as I know, in which they are found wild. They take little exercise, live mostly on vegetables, though sometimes, indeed, they pick up insects, and are chiefly delighted with grain. Hence they are a food of tender structure, easy solution, little alkalescency, and, as a white meat, gelatinous. When very young, they are extremely viscid, when old, tough and ligamentous; so that the proper time of using them is in a middle state, between these two extremes, i. e. when about a year old.

A question here arises about the feeding of animals, it being doubted whether a crammed, or barn-door fowl, is preferable. Many of our modern arts of feeding, besides giving more succulency and tenderness to the food, encrease its alkalescency: As giving succulency, they are an improvement, but, as giving alkalescency, a dangerous one, though even with that they make solution more easy. Exercise, however, is necessary to give perfection, for, by this means, the fat of the animal is equally dispersed through the muscular parts, whereas, when the animal is fatted hastily, the fat is accumulated in a particular part, viz. in the cellular texture,
more

more strictly so called ; so that an exercised animal of equal weight, *cæteris paribus*, with a fed one, is much preferable.

The next bird mentioned in the Catalogue, is

The MELEAGRIS GALLOPAVO,

another of the *Gallinæ*, under the generical name of *Meleagris*. The *Meleagris Gallopavo*, or turkey, with regard to its qualities in food, is entirely the same as the preceding, being equally tender, soluble, and alkalescent.

The next bird we come to, is

The PAVO CRISTATUS, or PEACOCK,

which is somewhat of a white flesh, but firm and rigid, and partly from the coarseness of its texture, and partly from its not being prolific, is now properly enough neglected. The Romans formerly used, but probably only for show, our Peacock as food. It was remarked that the boiled Peacock would keep very long; but in this there is nothing extraordinary, as was imagined; for the most putrescent part of the food is the fluid, and this, by boiling, is extracted, and leaves only the solid fibres behind. Now, if what is called jerking of beef in the West-Indies, or hand-roasting it, in both which cases the fluids are not so accurately drawn out, have the effect of preserving meat for a considerable time, how much greater must that effect be expected to be from the more rigid texture of the Peacock, exsuccated by boiling.

PHEASANT.

Next the Peacock should have been inserted the Pheasant, as it is the first among the wild fowl ; but because Linnæus has given *Phasianus* as his generical name for the *Gallus Gallinaceus*, &c. it was omitted: Here, however, it shall be mentioned, as it is in its

proper place. The Pheasant is a wild fowl, is more exercised, and hence, and from its living on the drier vegetables, and insects, more alkalescent than the tame fowl, and also, from its being capable of fattening, is more soluble.

The five following belong all to one genus, the *Tetrao* of Linnæus. The two first,

TETRAO PERDIX *et* COTURNIX, *i. e.* the PARTRIDGE and QUAIL,

approach in their nature to the tame fowl, but are more sapid, tender, and alkalescent, the chief cause of difference residing in the alkalescency.

The three last, *viz.*

The LAGOPUS, TETRIX *et* UROGALLUS,
as living more on insects, are more alkalescent than the two former, much more so than the tame fowl.

In following Linnæus, I have omitted

The GROUSE, or RED GAME,

which, however, I meant to comprehend under the term *Lagopus*; although Linnæus does not seem to be acquainted with our red game, which, however, is the *Lagopus* of other Naturalists, and the *Lagopus altera Plinii*. The qualities of these are very much in common. From its size, rather than any real difference, is, I imagine, the black game thought more firm, tho' perhaps, from its living on very high mountains, it is seldomer got young. I have mentioned young food as viscid and gelatinous, but these of which we are speaking are not so, which is an exception to the general rule, and which I impute to the greater alkalescency of the kind.

A N -

A N S E R E S.

Next in order come the *Anseres* of Linnæus, which term may properly be translated Water Fowl.

From their nature, the water fowl are much exercised, and being generally carnivorous, are more alkalescent than the tame; whether they are more so than the wild fowl, is undetermined. Certain however it is, that, whether from their less alkalescency, or peculiar nature, they are less soluble than these, so that, if we here apprehend a greater alkalescency, we must likewise suppose a greater viscosity, which indeed they generally possess more than the wild fowl.

Linnæus using *Anseres* for the generical term, uses *Anas* for the goose as well as duck; but, for fear of confounding you, I have avoided the scientific terms.

ANAS DOMESTICA, the TAME DUCK.

Here Naturalists commonly have, although different in their manner of living, considered the tame and wild animal as the same: However that may hold in natural history, we must make a difference in their qualities, as food. The wild duck is more alkalescent, more tender, and more easily dissolved than the tame, and, in general, this difference takes place between wild and tame animals, if they are taken at a suitable age and proper season. Old animals are generally more alkalescent and more easily soluble than the young: Many animals, however, are not viscid when young, so that, in this case, the rule is contradicted. All wild animals, too, differ according to the season, either from the time of their molting, or the quantity of food they then get.

The

The next mentioned, is

ANAS MOSCHATA, or MUSCOVY DUCK,

which seems to be of the same qualities with the former, but somewhat of a more firm and less tender texture. First when these were known here, they were reared with very great care, but are now more commonly neglected.

Of the *Boschus major*, or Wild Duck, we have already spoken, under the *Anas domestica*. We go on to the others mentioned in the Catalogue.

The QUERQUEDULA, or TEAL,

is very much of the nature of the wild duck, and is the most tender and alkalescent, the least viscid and most savoury of this kind.

ANSER DOMESTICUS, TAME GOOSE.

This is no less alkalescent than the duck, is manifestly less viscid, but of a firmer texture; its solution, however, is not so constant, depending more on a difference of stomach.

CYGNUS, SWAN.

In food, this is now very rarely used; in its young state, it is by far the most rigid of any of their order: It is of difficult manducation, and so far as texture can occasion that, of difficult solution in the stomach.

Here I might have inserted a great many more of the ANSERINE tribe, but I was not so well acquainted with them as to point out their difference: They are all wild, and, from their oeconomy or food, we may judge of their qualities. As living on fish, they are viscid and alkalescent. I have set down two, the *Pelicanus Bassanus*,

or

or *Solan Goose*, and the *Alcatorda*, the Murret, or, in England, the *Razor-bill*, which may serve for the rest.

S O L A N G O O S E.

This is one of the most alkalescent foods we use here. It is an animal not much exercised, and, when old, insoluble, but, when young, it is very easily soluble, and when it agrees with the stomach may be taken in large proportion, even in weak ones, as I myself have experienced, and though alkalescent, gives little inconvenience on that account. It is commonly talked of as a whet to the appetite; but this must not be taken seriously, although, indeed, it is of remarkably easy solution. All this illustrates what has been said on the solubility of food depending on its alkalescency, and hence, in some measure, may be understood the qualities of other sea fowl used in diet.

G R A L L Æ.

The GRALLÆ, the next class I am to mention, are much connected with the former, as being aquatic birds, though not always swimmers or divers. They live often in marshy grounds, catching fish, insects, &c. They have been called *Limosugæ*, or Mud-suckers, but improperly, as they take up the earth only as it contains insects, or agitate it with their bills to bring up worms. For walking in marshy places they are provided with long legs, called *grallæ*, from their likeness to those sticks on which people sometimes walk, whence their *gradus grallatorius*. I have set down a number of different genera. *Ardea*, the Heron, and Bittern; *Scolopax*, the Woodcock, Snipe, and Curlew; *Tringa*, the Lapwing, in Scotland the Teachat, and Peaseweep, and Grey Plover; *Charadrius*, the Green Plover; *Hæmatopus*, the Sea Pye; *Fulica*, the Coot; *Rallus*, the Rail, in Scotch the *Corncraig*; *Otis*, the Bustard. With a view to their qualities as aliment, I shall begin with

The O T I S.

It is doubtful whether this ought to be ranked with the other *Grallæ*, it being a land animal, living on grain, and rather, I believe,

believe, should have been kept with the *Gallinæ*. Its flesh approaches to that of the partridge, and its qualities are much the same with those of the wild fowl of the *Gallinæ*.

I consider the *RALLUS* as likewise belonging to the *Gallinæ*, though, indeed, a species of it, the *Rallus aquaticus*, more evidently belongs to the *Grallæ*. In many countries they are considered as Quails; and in Italy called the King of these, *Il Re di Qualli*. With exception of these two all the rest stand properly in the same order; but, from certain circumstances, are of different qualities, viz. being inland or not, &c.

Of the inland kind belonging to the *Scolopax*, are

THE WOODCOCK and SNIP E,

which, although insectivorous, appear to be less alkalescent, of a tender structure, approaching to the white meats of the gallinaceous kind.

Here may be illustrated what we have said of exercise producing firmness. The Woodcock is obliged to fly much about, while the Partridge walks more and flies less. Hence it is observed, that the wing of the Woodcock is always very tough, while that of the Partridge is very tender; and, on the contrary, the leg of the Woodcock is very tender, while that of the Partridge is very tough. Hence the proverb, Give the Woodcock the Partridge wings, he will be the most delicate of birds.

CURLEW.

This also belongs to the *Scolopax*, but living on fishes, and at sea, is very alkalescent, and approaches in quality to the Solan Goose.

TRINGA.

The *Tringa* are more alkalescent than the Woodcock, but less so than the *Scolopaces*, who live on fish, as being inland birds. A difference

difference occurs in the species, the Lapwing using its wings much, being of a firmer texture; while the Grey Plover, taking less exercise, is more soluble.

The CHARADRIUS, or GREEN PLOVER,

is much more alkalescent than the Woodcock or Snipe.

Next come

The ARDEA, HERON, and BITTERN.

These are of a firmer texture than those we have mentioned, and, when old, are of little use. In their young state they are commonly fat, sufficiently soluble, alkalescent, and of exquisite relish. It would be worth while to examine accurately the qualities of the Heron and Bittern, as we should then know what difference followed from animals of the same genus living on fish or on insects.

Those which remain of the *Grallæ* are entirely sea fowl. The *Hæmotapus*, or Sea Pye, and the *Fulica*, or Coot, with the Curlew, which we have mentioned under *Scolopax*, are more alkalescent than the other *Grallæ*, approaching in their nature to the Solan Goose.

We now come to the AVES PASSERES of Linnæus, of which we have a very great variety. I have only set down four of the *genera*, which seem to me to be the chief. It is difficult to say whether they have common qualities: Enquiry would probably shew us some difference, as they were granivorous or insectivorous.

The COLUMBA, or PIGEON KIND, are hot and alkalescent from much exercise, perhaps more so than any other of these who live on grain. When young, they are tender, and of easy solution.

T

With

With regard to the smaller birds, the *Alauda*, *Turdus*, & *Emberiza*, the Lark, Thrush, and Yellow Hammer; of these I have but little experience, and of many more which are comprehended under these generical terms. There is probably a difference, according to their exercise and food. I shall only say, that when taken at a proper age they are tender, succulent, and alkalescent.

I mentioned formerly my omission of the AMPHIBIA, which it is here proper to supply; as they are of a middle nature between birds and fish, the meaning of the term is doubtful. It is commonly applied to animals who live both on water and land, and so includes both birds and beasts. Linnæus's distinction is this: The Beasts have a heart with two auricles and two ventricles, a warm blood, and lungs which breathe alternately; whereas the *Amphibia* have a heart with one auricle and one ventricle, a cold blood, and lungs which breathe arbitrarily. They are divided into three orders,

THE SERPENTES, REPTILES, & NANTES.

Of the REPTILIA there are three *genera* employed in food, the *Testudo*, Tortoise, the *Lacerta*, Lizard, and the *Rana*, Frog.

TESTUDO, TORTOISE.

Of this there are several species used in food. The green Turtle is now become a famous delicacy. It is of a peculiar nature, having its fat of a green colour, of a remarkable odour, affecting the urine and sweat, the colour of which last is also altered. From this it has been supposed of peculiar qualities. From its odour, &c. it might be medicated, but these have no effect on its qualities as nutriment. From some particulars in its œconomy, from its little motion, and its living on vegetables, it is less alkalescent than any of its kind, of a very gelatinous nature, and highly nutritious.

Of

Of the numerous *Lacertæ* there are few employed in food. There is only of which I remember, the Guana of the West Indies. This is there esteemed a great delicacy, and of tender texture. From peculiar antipathy against the animal, when in that country, I could not examine its qualities.

As to the FROG, one of its species is used in France, the *Rana æsculenta*. I am ignorant of its qualities for want of particular experience. As far as we can depend on Geoffroy, this animal, from affording little volatile salt, seems not very alkalescent, nor, from others of Mr. Geoffroy's experiments, very gelatinous. But, considering the class to which it belongs, and from any small examination I myself have made of it, it would seem in its nature to approach to the Tortoise and Guana.

V I P E R.

Of the *Amphibia Serpentes*, I know only one species used in food, namely, the Viper. It is still uncertain whether this is to be considered as food or medicine. It has been much talked of in the last intention, though, in my opinion, it can have little power as such; for medicines are such bodies as alter the system *suddenly*, without being *conquered* by it. Now Vipers are commonly used in broths, and prove very *nutritious*, being continued for a *length* of time. Neither, indeed, is its volatile salt, which has been esteemed a famous remedy, different from that of other animals. Upon all which accounts I conclude that its virtues, as *medicine*, must only be in consequence of its nutritious quality. As a food, from Geoffroy's experiments, I perceive it is sufficiently soluble, approaching in this, and the quantity of juices it affords, to Quadrupeds; and to Fishes, in the *gelatinous* nature of these juices. Like all the *Amphibia*, it is of an intermediate nature between Quadrupeds and Fish, though in its qualities approaching more to the latter. I told you that, for want of other principles, I determined the alkalescency of animal substances from the quantity of volatile salt

they afford. The Viper, as affording less of this, I conclude to be less alkalescent than Quadrupeds or Birds.

As in Natural History we observe one kind by insensible degrees passing into another, so here the *Amphibia* connect the Quadrupeds and Fishes. Of these the Reptiles, on the one hand, approaching to Quadrupeds; while the *Serpentes*, on the other, come nearer to the Fishes. There is still another order of the *Amphibia*, viz. the *Nantes*, the same which formerly went under the name of the Cartilaginous Fishes. I have marked three of these at the end of the Fishes, viz. the *Petromyzon*, or Lamprey; the *Rara batis*, or Thornback; in Scots, Scate; and the *Accipenser Sturio*, or Sturgeon. There are two or three more *genera* belonging to this order; and the *Squalus*, or Shark kind, is sometimes used in food. I said they were formerly classed with the Fishes; but Linnæus, considering that in their skin, lungs, organs of generation, and that in their being viviparous, &c. they approached to the *Amphibia*, has very properly ranked them in this class. With respect, however, to their qualities as food, they are little different from the Fishes, though indeed I should suppose they approached to the other *Amphibia*. They afford a more gelatinous food than any of the Quadrupeds, or *Amphibia*, and probably are more nutritious. As to their alkalescency, from the quantity of volatile salt they afford, I conclude they are less alkalescent than the animals above mentioned, and more so than the Fishes.

F I S H E S.

After saying somewhat on the QUADRUPEDS, BIRDS, and AMPHIBIA, I come to the FISH kind. I have only set down those which are commonly used, though in England perhaps more may be used. The first of these in the Catalogue is the *Canus* of the *Salmo*, of which there are fix species. *Salmo salar*, the common Salmon; *Salmo trutta*, is the river Trout; in Scots, the bourn Trout; *Salmo lucio*, in the North of England, bull Trout; in Scotland the Lochleven.

Lochleven Trout; *Salmo eperlanus*, the Smelt; in Scots, the Sperling; *Salmo thymallus*, the Grayling, or Umber, which is not known here; *Salmo Alpinus*, the Charr, which lives in the coldest water in which any animal will live. After these follows in the Catalogue another genus, the *Cyprinus*, of which eight are mentioned; *Cyprinus barbus*, the Barbel; *Carpio*, the Carp; *Gobio*, the Gudgeon; *Tinca*, the Tench; *Cæphalus*, the Chubb; *Rutilus*, the Roch; *Alburnus*, the Bleak; *Brama*, the Bream. After these is mentioned the genus of the *Perca*, of which the *Perca fluviatilis*, or common Perch. After this comes again the *Gadus*, of which six are mentioned, *Æglefinus*, Haddock; *Merlangus*, Whiting; *Morbua*, a Cod; *Molva*, Ling, *Virens*, in Scotland, Greenback; *Callarias*, in Scotland, the Codling, or Redware, though of this I am not certain. After these is the *Cyclopterus lumpus*, the Lump Fish, or Sea Owl; in Scots, the Cock Paddle. Next to this follows in order the *Scomber Scombrus*, the Mackerel; *Scomber Thynnus*, the Tunny, or Spanish Mackerel; *Trigla cuculus*, the Red Gurnard; *Mugil*, the Mullet; and *Esox Lucius*, the Pike. Next to these come the *Clupea*, of which four are set. *Clupea harengus*, the Herring; which I do not know if the Pilcher be the same species; *Sprattus*, the Sprat; in Scots, the Garvey; *Encrasicolus*, the Anchovy; *Alosa*, the Shad. After the foregoing are set down the *Pleuronectes*, of which five are marked; *Eleus*, the common Flounder; *Solea*, the Soal; *Plateffa*, the Plaife; *Maximus*, the Turbot; *Hypoglossus*, the Holibut. In England, what is called the Holibut, is in Scotland the Turbot, *et e contrario*.

Before we come to the *Amphibia Nantes*, which were placed here as formerly ranked among the Cartilaginous Fishes, are set down *Ammodytes*, the Sand Eel; *Muraena Anguilla*, the common Eel; *Muraena Conger*, the Sea Eel; and by mistake, as supposed an aliment, *Anarrhichas*, the Sea Wolf.

OF QUALITIES of FISHES in general.

Their *texture* is generally more tender than that of Flesh, and they have nothing of a fibrous structure. With respect to their *solution*, after all, the matter does not seem determined; for from Geoffroy's experiments it appears, that they give less soluble matter out of the body than Flesh. It is however very probable, that the powers of our stomach, the fermentation which is excited there, exceeds greatly any power we can apply out of the body; and, so far as we are able to judge, they are of more easy solution than Flesh Meats. Broths, however, of Fishes do not form into a jelly, though there is somewhat gluey and viscid, which, like the young meats, makes them long retained in the stomach; yet, after all, I do not find, that even in this case of their longer retention and difficult perspirability, that by ruminant men, if I may so call them, they are so often brought up as other foods.

The alkalescency of Fishes seems less than that of Meats, their putrefaction being slower, and their yield of volatile alkali less. There is in the solution of this food something particular, which is not yet properly enquired into. We use oil or butter sometimes with our vegetable aliment, oftner with Meats, but more frequently still, and in greater quantity, with Fishes. This certainly, if properly understood, would throw some light on solution of this aliment, as it seems to be a rule followed from some instigation of instinct, rather than precept of reason. I formerly spoke of the *stimulus* given to the stomach by the alkalescency of Meats, which, at the same time, I told you might be produced by viscidty and long retention there. In the Fish kind this is more remarkable, they being a very short time in the stomach before they produce heat, fever, thirst, and sometimes efflorescences over the whole surface of the body.

You will easily see, from the difficulty of giving the general qualities of Fishes, how little you can expect to be said on particulars.
In

In order to the understanding the qualities of Fishes, they have been considered as differing in being River or Sea Fish, *Saxatiles* or *Limosa*, *i. e.* those living in gravelly bottoms, or such as, like the Lamprey, lie at the bottom, in the mud, &c. But in neither of these divisions do I find any certain foundation for ascertaining the difference of Fishes as aliment. Dr. Cheyne was extremely fond of the distinction by Colour, the White being supposed less stimulant, and the Red more so. In Birds and Quadrupeds this, indeed, will hold; but there are, except the Salmon, few Fishes but what are of a white colour, so that this distinction will go but a little way. As we found a difference in other aliment from a difference of food, the same would seem to take place in Fishes, all of whom are mostly carnivorous; nor does any difference in the kind of animals they eat seem to make any difference in their qualities: The Perch, *e. g.* who eats mites, fishes, insects indifferently, and all of them rapaciously, and indeed, besides, water fowl, &c. is not more alkalulent than those who live on insects alone, &c. Nor indeed are they to be distinguished entirely from their different *genera*, though that indeed comes nearest the truth of any other of the distinctions. Now we proceed to the particular *genera*.

S A L M O N.

Most of this genus are *fluviatiles*, or *lacustres*, of a tender substance, sufficiently succulent and nourishing. They are also alkalulent and heating, and efflorescences, &c. are as frequent from them as any other fish. The red kind are of a higher relish and alkalescency, the white are soft and gelatinous. Here I may observe, that Linnæus seems to have forgot what are called our Salmon Trout, which are undoubtedly more stimulating and alkalulent, and less gelatinous than those of the white kind.

C Y P R I N U S.

This genus is of greater variety than the former, drier, and less tendinous, less sapid and heating, and among the fishes of a nature little gelatinous.

To

LECTURES ON THE

To these in nature approaches the Pearch, which is of firm texture, but tender substance, easily soluble, not glutinous, heating, or remarkably stimulant.

G A D U S.

These are Sea Fishes, and those of them we are best acquainted with are the Whiting, Haddock, and Cod. These give a gradation in tenderness, glutinosity, and stimulus to the system, the Cod being the firmest, most viscid, and heating of the three.

Fishes are often distinguished as being more or less squamous. All those we have mentioned are the scaly kind. The *Amphibia* and Eel kind have no scales. The Flounder is intermediate betwixt the two. The squamous are universally less glutinous than those without scales, easier miscible in the stomach, though less nutritious. Before the squamous I set down

C Y C L O P T E R U S L U M P U S.

The Lumpus Fish is remarkably glutinous, without scales, approaching in quality to the Eel, and remarkably nutritious to them who use it. The *Mackarel* is a drier substance and less nutritious; the Tunny is mentioned here inadvertently, as it is only known in the Mediterranean, and is there said to be more succulent and nutritious than the common Mackarel.

TRIGLA CUCULUS, RED GURNARD.

This is a remarkable sapid Fish, of the white kind, said to be considerably nutritious, and much valued in those places where it is used.

M U G I L, M U L L E T.

I am not certain if our Mullet be the *Mugil* of the Romans. It certainly has not the exquisite relish for which they valued theirs,
and

and seems to me to be of a middle between the Carp and Haddock, less dry than the one, and more succulent than the other. It is sufficiently soluble and nutritious.

E S O X L U C I U S, the P I K E.

This, though rapacious and carnivorous, is yet a dry, little oily and little alkalescent food, and one of the least heating of any we take in. We must suppose, then, considering these qualities of this fish, that there is somewhat peculiar in their œconomy which gives rise to them.

C L U P E A.

All this genus, comprehending the Herring, &c. are of an oily, succulent, nutritious nature, in their heating quality being next to the Salmon, quickening the pulse to a considerable degree.

PLEURONECTES, the FLOUNDER KIND.

This genus comprehends several species: They are all of a tender, oily, succulent nature, more glutinous than the preceding, but less so than the following. They are set down according to their qualities, the Flounder and Soal more tender, the Turbot and Holybut more glutinous.

E E L K I N D.

Some here are without *squamæ*, much of the same quality with the Viper, viscid, nutritious, and difficultly perspirable; by long retention in the stomach, heating and oppressive. As to the different species, I am not in a condition to ascertain the difference.

I N S E C T A.

This is a class little thought of as food. In some countries the Locusts and Grasshoppers are used as food. I can say nothing

of the Grasshopper, but that it approaches in nature to the Shrimp. The whole of the Crab kind, although different in their class, approach in their quality to Fishes in not being easily dissolved by decoction, to the *Amphibia* in giving a jellied broth, and again to the Fishes in stimulating the system. They afford little volatile alkali, and to some are a very peculiar *stimulus*, producing heat, anxiety, and fever. The three mentioned in the Catalogue are, *Cancer Pagurus*, the Crab; *Cancer Gammarus*, the Shrimp; *Cancer Squilla*, the Lobster.

V E R M E S.

These were formerly confounded partly with the Fishes; for the reasons of classing them separately, *vide* Linnæus, vol. I. *Systema Naturæ*. They are of five orders, two only of which are used as aliment, the *Mollusca* and *Testacea*. Of the *Mollusca*, the first species in the Catalogue is the *Sepia Loligo*, in Scotland the Stocking Fish; in England, the Ink Fish. With regard to its qualities, it has none but what is common to it with the rest of the *Vermes*. Of the *Testacea* I have only set down such as are found on our shores, and give for them Linnæus's *trivial* names. After the *Sepia*, I have set down eleven of the *Vermes*, viz. *Patella vulgata*, Limpet, Papsell; *Helix Pomatia*, the Garden Snail; *Buccinum undatum*, the Welk; in Scotland, the Bakky; *Turbo littoreus*, Periwinkle; in North of Scotland, the Black Welk; the Razor, in England; *Cardium edule*, the Cockle; *Cardium echinatum*, prickly Cockle; *Venus Chione*, Gawky in Scotland; *Ostrea maxima*, Scallop; Clam in Scotland; *Ostrea edulis*, common Oyster; *Mytilus edulis*, common Muscle.

The qualities of the whole of the *Vermes* is nearly the same. They are of a more tender texture than any other Animal Food, and thus would seem to be of very easy solution. But they afford, perhaps, the most viscid gluten of any of the Animal Foods, by this means affect the mixture in the stomach, and more the last digestion,

digestion, by which they are with very great difficulty expelled. By this means they are among the nourishing of Animal Foods; and though as Animal Substances they are alkalescent, yet they are among the least so, and least heating to the system.

Sepia loligo & *Solen filiqua*, or Spout, appear to possess nothing but the common qualities of the *Vermes*.

The four first mentioned of the *Testacea* are *Univalves*, and the animal inhabiting them of the same genus; the last four are *Bivalves*, and the animal inhabiting them of the same genus, in all called, by Naturalists, *Tethys*; so that really we have only two animals to treat of. With regard to the Snail, it has the general qualities of the Worms in a high degree, of a tender texture, easily soluble, but viscid and imperspirable. The Garden Snail is not known here as food, but in some of the southern countries it is reckoned a delicacy, and very nourishing food. Our own Snails are sometimes boiled in milk, and employed as a medicine in hectic cases, and I myself have seen remarkable advantage from them where there were no ulcerations, they soon recruiting the emaciated habit; but in case of ulcerations, these, as well as all other animal food, are very improper. A remarkable instance of the nutritious quality of Snails appears in the famine, which happened in this country about sixty years ago, of two girls being found to be remarkably nourished from Snails alone, while others of the poorer sort were meagre and half-starved.

With regard to the other *genera*, they are more commonly employed, but seem to be less tender, and therefore, perhaps, less nutritious.

B I V A L V E S.

Of the *Bivalves*, the most common is the common Oyster: It is among the few Animal Foods we take in raw, and in that state can be taken in much larger proportion, and more easily digested, than
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when

when dressed. Keil and Sanctorius both agree in calling it a food of slow perspirability. Keil says it retards perspiration of other food; but this I confess I do not understand. On this account they are nutritious, and, though long retained, as little heating as any to the system.

The rest of the *Bivalves* are less soluble and tender; some of them are said to be somewhat poisonous, as the Muscle and Limpet, but in what part of them this resides I cannot tell; something, however, is always rejected.

E G G S of B I R D S.

These might have been set down after the Birds, but, as they are somewhat analogous to the last mentioned food, I have placed them here. It is obvious, from their nature and use in the nourishment of the *fetus*, that they contain a larger proportion of pure nutriment than any other aliment, as they give no *fæces*; for every other kind of animal food has some of its juices gone farther to putrefaction than the *albumen* which is extracted in our stomach, which are deposited in that form. After all, Eggs are not of easy digestion, and, from the proportion of nourishment they afford, cannot be taken in large quantity. Whether the difficulty of digestion in Eggs resides naturally in the viscosity of the *albumen*, or in the coagulated state in which we take it in, is a question; it seems at least to be increased by coagulation, as the hardest Egg is most difficult of digestion. I do not think the insolubility resides in the Yolk, as some have supposed, for I have known persons reject the White, and live on the Yolk entirely, which is of different qualities, and designed for an after-food. I have already mentioned the insolubility of the *albumen ovi* out of the body, by heat, &c. and said it could only depend on fermentation. Eggs approach to the *Vermes* in viscosity and difficult perspirability; they are less alkalescent than Flesh, some of whose juices have always proceeded too far. A proof of the little alkalescency of Eggs, is from their being the Animal Food least apt to pall. Some have supposed bad qualities,

lities, but I know no instance of any: They are sometimes noxious to certain persons, but this we must explain from an idiosyncrasy.

This is all that occurs on the subject of Eggs. I should next go on to consider Medicines, but, before that, shall recapitulate a little what has been said on the subject of Aliment. From the whole you will perceive, that Aliment is divided into Vegetable and Animal, and that Milk is of an intermediate nature between both, acescent as the vegetable, but not liable to its noxious acescency; nourishing as the Animal, though not liable to its noxious alkalescency. The acescent Vegetable Aliment seems absolutely necessary to the human œconomy, and there are none of the human species but what employ it. How far we could dispense with Animal Food is uncertain; it seems rather useful than necessary, in order to give great strength, and for subsistence and long duration of life little proper. Farther, the Vegetable Aliment is never hurtful, except in the *primæ viæ*, and in these only of the diseased: Its effects never appear in the blood-vessels. On the contrary, Animal Food, which is more nourishing, easily goes to excess, and exposes to danger, readily, by its alkalescency, laying the foundation of diseases, and as well as its other qualities, *e. g.* corpulency, obesity, and putrescent acrimony.

E F F E C T S of A L I M E N T on the M I N D.

It is plain the delicacy of feeling, liveliness of imagination, quickness of apprehension, and acuteness of judgment more frequently accompany a weak state of the body. True it is, indeed, that the same state is liable to timidity, fluctuation and doubt; while the strong have that steadiness of judgment, and firmness of purpose which are proper for the higher and more active scenes of life. The most valuable state of the Mind, however, appears to reside in somewhat less firmness and vigour of body. Vegetable Aliment, as never over-distending the vessels, or loading the system, never interrupts the stronger motions of the Mind, while the heat, fulness, and weight of Animal Food is an enemy to its vigorous efforts. Temperance, then, does not so much consist in the quantity, for that always will be regulated

regulated by our appetite, as in the quality, *viz.* a large proportion of Vegetable Aliment. So much in general. Vegetable Aliment consists of sugar and oil, both separately nutritious, but in that state liable to disadvantages. Sugar is of difficult assimilation, especially if its acid is evolved; as then, like the recent fruits, it will be a proper subject for the vinous fermentation. Oil is more difficultly mixed, and oily foods more so in proportion, as that is more separate. The *Farinacea*, where the oil and sugar are intimately blended, are the most perfect of Vegetable Aliment, and of these the *Cerealia*, as you will now easily know from their qualities.

Animal Food differs in alkalescency and viscosity. The Quadrupeds and Birds are the most alkalescent, the Fishes and Vermes the most viscid. Alkalescency seems to depend on the heat of the Animal. The Quadrupeds and Birds have the greatest heat, the Fishes and Worms least. A farther proof of the less alkalescency of Fishes is, that with Animal Food we are constantly led by instinct to take in Vegetable Aliment. The same instinct has never led us to take it in with Fishes. For experiment sake, I have sometimes taken Apples along with Fish, and found them to disturb digestion. The flesh of Quadrupeds and Fishes is, on account of its alkalescency, more easily dissolved, and sooner assimilated into blood, giving easiest nourishment and strength, while on the same account it is wisely ordained that it is sooner expelled. Fishes and Worms, on account of their viscosity, are more difficultly dissolved and assimilated, retained longer in the system, and only heating from their retention, and thus even accumulating the fluids, and affording nourishment to the solid parts.

O N T H E

VIRTUES of MEDICINES.

HA V I N G finished the subject of Aliments, I proceed in the next place to consider *Medicines*. As introductory to this, I think it necessary to tell you the manner of investigating their virtues. As the foundation of what I have to say on this, I shall take the following Canon from Linnæus, in his *Materia Medica: Systemate, Qualitate, et Experientia eruitur omnis usus Plantarum*.

What he here applies to Vegetables, will, in some measure, suit the other Kingdoms. The two first qualities he explains more fully in his *Philosophia Botanica*, where he employs the term *Fructification*, which is the same with the term *System*; for, according to the fructification, are plants systematically disposed. In giving the qualities of Aliment, I have often alluded to its place in Natural History, and shall be obliged hereafter to do so more in giving the qualities of Medicine. This method of investigating the virtues from the Botanical Divisions, was long since started by Hoffman, in his treatise *De compendioso methodo, &c.* and before him by our countryman Dr. Blair, in the *Philosophical Transactions, &c.* The Botanical Rules are, however, far from being general; but, as far they go, they serve very well for analogy, and it is on this account we shall often have recourse to them. But before you can be acquainted with these Rules, it will be necessary to give you an idea of Method in Natural History in general.

Method

THE APPLICATION OF NATURAL HISTORY

Method in Natural History in general, is that by which a production of Nature being presented, we can proceed to know how it can be distinguished from all other productions of Nature, and the name by which *Writers* have distinguished it, in order that, by this means, we may arrive at a knowledge of its nature, qualities, and virtues. This is done by collecting natural productions into Kingdoms, Classes, Orders, *Genera*, and Species. As to the first division, if a subject were presented to me, in which I could observe no proper organization, no difference between the containing and contained parts, I would conclude it to be of the *Mineral* or *Fossile Kingdom*. A Fossile also has no appearance of the *vita multiplicata*, or power of propagating its like. But if there be a difference between the containing and contained parts, and if it have the power of multiplying itself, I conclude it is either of the *Animal*, or *Vegetable Kingdom*. Again, to distinguish these, if I find the subject fixed, or, when moved, to have no locomotive power, or arbitrary means of moving itself, I conclude our subject to be Vegetable; for Animals are organized bodies, endued with *vita multiplicata* and a locomotive power, or, if fixed, have the arbitrary power of moving their parts. These are the largest collections, and are called **KINGDOMS**.

Each of these is again subdivided into Classes, &c. In order to give a notion of these, it will be easiest to take examples from the Animal Kingdom; as with that you must, in some measure, be already acquainted. The Animal Kingdom is divided into six *Classes*. Linnæus has first attempted a division of them into three; from the structure of their heart, and the heat and colour of the blood. The first have a heart of two ventricles, and two auricles, and a warm red blood; the second have a heart of one ventricle, and one auricle, with a cold red blood; the third have a heart of one auricle, and one ventricle, with a cold white blood, or, as Linnæus calls it, *sanies*. If we were to examine these strictly, I believe they would not answer so well; so I rather chuse to take the six subdivisions; viz. *Mammalia*, *Aves*, *Amphibia*, *Pisces*, *Insecta*, *Vermes*.

1. The

1. The *Mammalia* have a heart with two auricles, and two ventricles, with a warm red blood, are necessarily breathing, having their respiration alternate, succeeding in a short time; *maxillæ incumbentes*, or jaws laid horizontally on each other, in opposition to those which open laterally, and these jaws always covered; *penis intrans*, or the parts of generation of the male entering the female, who is always viviparous, provided with breasts, and suckles her young.

2. *Aves*, same heart and respiration as the *Mammalia*; *maxillæ incumbentes*, but not covered, *exsertæ*, or having the *maxillæ* stretched, without the parts of the head; *edentulæ*, or without teeth; the male, too, enters the female, but are without external testicles. Their females are oviparous, and have their eggs covered with a calcareous crust. The whole of them are always covered with feathers, and have only two feet. I shall give the reason why I did not use this in the distinction of the *Mammalia*, viz. that it did not suit to all of them; some having, and some wanting, four feet.

3. *Amphibia*, have a heart of one ventricle, and one auricle, with a cold red blood. There is some doubt with regard to the universality of distinguishing them by one auricle, and one ventricle; but the exceptions are not certain. When I say a *cold*, I mean one not much warmer than the surrounding medium, whether that be air or water. They have lungs with which they breath arbitrarily; they agree with the two former in *maxillæ incumbentes*; they have two *penises*: The females are generally oviparous, though not always so; when they are, their *ova* are covered only with a membrane. Their teguments are neither hairs nor feathers. Their feet are too various to be characterised.

4. *Fishes*; one auricle, and one ventricle, with the same blood as the *Amphibia*. They differ from the three former, in not being breathing animals; but instead of lungs are provided with *branchiæ*, which alternately take in and let out water, instead of air. They have *maxillæ incumbentes*, no *penis*, all are oviparous,

and their eggs are said to want an *albumen*; a fact which I am very averse to believe. As to their *tegmenta*, their skin is universally covered with scales, and they have fins with which they swim.

5. *Insecta*; heart with one auricle and one ventricle, hardly a coloured fluid for blood. As to their respiration it is uncertain; they have no lungs, but are supposed to have somewhat analogous to them, *maxillæ laterales*, *penis intrans*; they are generally oviparous, whether universally is yet undetermined. I believe they are not. As to teguments, they are covered with a hard shelly substance, *catapbracta*, or coat of mail. They are distinguished from all the other Classes by their *Antennæ*, i. e. horns, or feelers, for directing their way, &c. but, indeed, we are not at all certain of their use.

6. *Vermes*. These have a heart with one ventricle, and one auricle, *sanie frigida*. With regard to their respiration nothing is determined, as they appear to have nothing analogous to it. As to their jaws they are various. As to their *tegmenta* they are never covered with shells; sometimes, indeed, they have a calcarious covering, separable from the body, and distinct from it; they have neither feet nor fins.

This is a specimen of our method of distinguishing into *Classes*. These Classes are divided into Orders. Of the *Orders* we shall give you an example in the *Mammalia*.

Of the *Mammalia* there are eight Orders. The first Order is, so many of Quadrupeds, and others which are not, but instead of feet have fins with which they swim, and are inhabitants of the water: They have the other general qualities of the *Mammalia*. These make a distinct Order, the *Cete*. The Quadrupeds are divided into the other seven Orders, according to the state of their teeth. 1. Those which have no fore teeth below or above, are called *Bruta*. Those which have them below and not above, are the

the *Pecora*. Those which have only two fore teeth above and below, without laniary, are called *Glires*, &c. &c.

But to take them in the order which Linnæus has placed them :
 1. *Primates* have four upper teeth, single *canini*, or laniary. 2. *Bruta* have no fore teeth above or below. 3. *Feræ* have fore teeth both above and below; six above, and all of them acute and sharp, with single *canini*. 4. *Bestiæ*; these have always more than one canine tooth in each jaw. 5. The *Glires* we have mentioned already; as also, 6. the *Pecora*. 7. The *Belluæ* have several fore teeth, which are blunted and obtuse.

After the *Orders*, the next division is into *Genera*; of which I shall give you an example in the *Pecora*, with which you are best acquainted. The ordinal character was taken from the teeth, &c. the generical characters are taken from the horns. The *Pecora* comprehends six *Genera*, the Camel, the Musk Deer, the Sheep, the Ox, the Stag, and Goat. The two first have no horns; the four last are horned. The Stag has solid horns without a hollow, branching backwards; the other three have their horns hollowed, and are distinguished by the direction of these horns. The cow kind have their horns turned forwards, (*porrecta*,) &c. *Vide Linnæi Systema Naturæ*, vol. i. Lastly, the *Genera* are divided into species, which are individuals which Nature has created. Of these I shall give you an example in the Camel. The whole species is not known. Four are mentioned by Linnæus: The Camel, Dromedary, *Glama*, and *Pacos*. The Camel has only one bunch, the Dromedary two, the *Glama* has no such bunch on the back, but one on the breast; the *Pacos* has no such tophy, or bunches at all, and is more distinctly covered with wool. Now to go backwards, and give an example of the whole. Suppose an unknown animal, *e. g.* the *Pacos*, was presented. From its four feet we reduce it to the class of the *Mammalia*, from having no teeth in the upper jaw, we trace it to the *Order* of the *Pecora*, from having no horns, we range it in the first or second *Genus* of those, we determine it to the first of these, from its having

more than one *lanarius*, or canine tooth, and lastly, from its being without *lappi*, and more distinctly covered with wool, we bring it to the *Pacos*, the fourth species of the Camel. When we have thus got its name, we look into books, and find its nature, history, and qualities. You see, then, how useful and necessary, although seemingly laborious, this method of Natural History is. From what I have said, you will understand what I mean by deducing the virtues of Medicines, from the place they have in Natural History; although to confirm you in it, more practice will be necessary.

We have now spoken of Kingdoms, Classes, Orders, Genera, and Species. This last is divided into *Varieties*. That is a Variety where the differences or marks by which it is known are not inherent in the subject, but depend on the soil, climate, &c. This takes place in the Animal Kingdom, but is much more remarkable in the Vegetable. In the last a variety is distinguished in this way, viz. if the seed put into the ground does not propagate the same variety, but comes up agreeing with the species. Now to go on with this subject a little further, I must inform you, the Method in Natural History is far from being perfect: For many disputes subsist among Naturalists, about the Classes and Orders to which subjects ought to be reduced. This depends on the characters assumed for arranging them at first; e. g. If I were to give flying as the fundamental characteristic of a bird, this would not be perfect, because there are flying *Amphibia*, &c. We much better than with Linnæus fix the character from the feathers, legs, &c. In the first method the Bat would be ranked among the Birds: But when we find that it has four feet, is viviparous, &c. it is properly placed among the Quadrupeds. Disputes of this kind have often occurred, and Linnæus himself is an example of this. Formerly, e. g. the *Cete* was ranked among the Fishes, as an inhabitant of the water, &c. but now, Linnæus considering that, excepting in this respect, it agreed entirely with the *Mammalia*, he has very properly ranked it among them; in which opinion Ray long ago agreed with him. In short, if we assume as the fundamental character of Fishes, that they are inhabitants

habitants of the water, we shall take in many *amphibia*, worms, &c. into the same Order. We must have regard to other qualities, as the structure of the heart, &c. before mentioned.

There still subsist many such disputes among Naturalists, with regard to every one of the divisions I spoke of; *e. g.* Klein, of Dantzick, divides Animals according to their claws, while Linnæus's division, you know, is according to the teeth. The Camel, with Linnæus, is in the order of the *Pecora*; with Klein among the Animals of two claws. Linnæus very properly ranked the Camel with the *Pecora*, for besides the external structure, it agrees with the rest of its rank in the internal, *viz.* stomach, &c. whereas merely on account of an agreement in claws, by Klein it is ranked among animals, otherwise essentially different. This leads you to understand the difference between natural and artificial order in Natural History. That method is artificial, which brings together Classes, &c. merely from one single arbitrary mark, or one that seemed most convenient in distributing these Classes, &c. That method natural, which brings into Classes, &c. such subjects as have the greatest number of marks or characters in common. The artificial method, although sometimes it may more easily enable us to distinguish *genera*, is yet, on the whole, very troublesome and confounding; and universally, the method which in Natural History is most natural, will be in practice of the easiest application; for besides collecting substances, which agree in external marks, it places together those whose internal properties are in common. There are few systems where we can preserve the natural method. The *Mammalia* of Linnæus is a very natural Class, as indeed most of his Classes are; but of this Class there are no natural orders, but the *Pecora* and *Cete*. The *Feræ* are nearly so, but all the rest are artificial distributions; *e. g.* in the *Primates*, which order comprehends Man, the Monkey is properly enough set down; for, besides having four teeth above, &c. it resembles in other internal properties; but the addition of the Bat, which agrees with the rest of the order only by its teeth, is certainly very unnatural.

tural. In his other Orders, the same difficulty is often found, to which only the subject of Quadrupeds, by attempting to reduce them to a few Orders (in which, indeed, he is much to be commended) he is perpetually exposed. Other examples will occur to you, upon looking into the system, as in his placing the Horse in the same genus with the *Hippopotamus*, merely on account of its teeth, &c.

To apply all this to our present purpose, which was in giving this sketch of Method in Natural History, chiefly to make you understand the difference between natural and artificial method.

Vegetables, in the same manner as Animals, are divided into Classes, &c. In every botanical method care has been taken to assume a natural one; but in none has it yet been perfectly obtained: And plants of dissimilar qualities in nature are often associated together, merely *lege systematis* as they speak. The investigation of the virtues of plants, from the system, is thus spoke of by Linnæus, in his *Philosophia Botanica*. *Plantæ quæ genere conveniunt virtute etiam conveniunt, quæ in ordine naturali conveniunt virtute proprius accedunt, quæ classe naturali conveniunt virtutibus quodam modo congruunt.* This rule is more exact as you advance to the lowest distributions, for in Nature there is no distribution certain, but that of species; even those of *genera* are much more artificial; and the higher you arise always more so; and for the application of this rule, as you see Linnæus has carefully marked, you must alone have recourse to the *natural* divisions. He has given these, independent of his Classes, &c. in his *Philosophia Botanica*, in what he calls his *Fragmenta Methodi Naturalis*. For our purpose, then, you must only study Natural History in this way, and you may always allow, I mean mostly, that those substances, which are in the same natural order, are somewhat of corresponding virtues.

Thus *Jalap*, *Mexican*, &c. are very properly ranged together. In looking over Linnæus's list, I find the majority he puts together
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are of the same virtues, and perhaps should find still more, if they were all employed in medicine. But often there are exceptions, and Linnæus ranges several, not without doubt, or *punctu interrogandi*? So much may be said in favour of the general rule. But although as an analogy it will serve to direct in the beginning of study, yet afterwards, on applying it to particular purposes, it is found to be fallacious; so that always we should be on our guard in using it. Cinnamon, Camphire, and Benzoin are ranged together under the *genus laurus*. All these, indeed, agree in *aroma*, but their particular virtues are very different. Many examples of the same kind occur*, and no order is without exceptions, when even in varieties† the virtues are different, and often in the *same part* of the plant; as in the aromatic rind, the bitter seed, and acid juice of the same Orange, &c. Besides, in medicine we often use different parts of the plant of the same species. Thus of *Senna* and *Cassia*, in the one we use the leaves, in the other the bark; parts which are found of different virtues. If the leaves of *Cassia* were employed, it is probable the general rule would apply‡. Our preparation also of a plant will alter its virtues, by correcting, destroying, or abstracting its acrid parts, an example of which you had formerly in the *Cassada*.

In my Catalogue I have set down my Plants according to the natural order. In how much they contradict the general rule, shall be mentioned when I come to treat of them particularly.

There is nothing, about which Physicians have been more anxious, than in finding the best method of investigating the virtues of un-

* Most of the *Sedums* are mild, but there is one very *acrid*. Among the *Cucumis*, the *Colocynth* is by far the strongest.

† Of this the Bitter and Sweet Almond is an example; one of which is an innocent, mild substance, and very nutritious; the other, to some animals, poisonous.

‡ The Potatoe, which belongs to the *Genus Solanum*, is another instance of this kind; and perhaps the same observation may be extended to it.

experienced

experienced substances. Various have been the methods for this purpose; many more than these I have mentioned. All the methods I chuse to employ, are expressed in the aphorism of Linnæus, which I have already set down. I have now explained the first means of investigation, *viz. Systemate*. I should next proceed to the second means, *viz. Qualitate*; but previous to that, I shall take notice of several other aphorisms of Linnæus; and first of that concerning the soil, or, as he calls it, the *locus* of Plants. It is this: *Locus ficcus sapidus, succulentus insipidas magis, aquosus corrosivas reddit*.

This rule, in some measure, may be admitted like other general rules, but, like them, has also a great many exceptions. Thus Rice and Rye, both of them bland nutritious substances, are exceptions to this rule. Rice must grow in some measure in water; while the Rye delights in a dry soil. The *Becabunga* is a very mild plant, the *Hyoscyamus* one of the most acrid; and yet the former grows in watery, the latter in dry situations. Even plants of the same genus, will, in the same soil, be very different; *e. g.* the *Perficaria mitis* & *urens*. Upon the whole, this rule seems to have been taken from a few observations, and those chiefly on the order of the *umbellati*. I imagine the two first *loci* mentioned, the *ficcus* and *succulentus*, will apply best to the same plant, growing in different soils. Thus an Aromatic in a dry soil is in the greatest perfection, while, transplanted to a rich moist one, it loses its fragrance, and becomes insipid. This does not apply so well to other species.

Another aphorism of Linnæus is still more general: *viz. Laëgentes plantæ communiter venenatae sunt*. For my part, I have met with no exception to this rule, and even those which have the milky consistence, though without the colour, generally agree with it. Linnæus himself gives some exception: *e. g.* the *Semiflosculosæ*, an order of plants, which we had occasion to mention as used in aliment. All these give milky juices, but are, however,

however, no certain exceptions; for several of the class are of deleterious qualities; and if those we employed as food, were allowed to attain their full perfection, they would probably be found of the same kind. It is on this account that we blanch them, or use them only when young. Linnæus, in a note, gives another exception, the *Campanulatæ* *, which in general are milder than the former; but as some of them are of dangerous qualities, the general rule ought still to make us cautious concerning them, and all other lactescent plants, which are unknown to us.

I now proceed to the investigation of the virtues of plants, *ex Qualitate, i. e.* according to the taste, smell, &c. Linnæus, 1. Aphorism. here is, *Inspidæ et inodoræ vim medicam vix exercent.* This rule seems to be without any exception; and it is on this account, and not on any proper experience, that many plants are expunged from the *Materia Medica*; as having no taste or odour, which should point out in them any active qualities; and most such, I believe, are employed as aliment. His other general rule, *Sapidissimæ et odoratissimæ maximam vim possident,* I cannot admit so indiscriminately; for the odour of Plants often resides in a portion inconsiderably small, whose effects must be very inconsiderable; neither must we take the medical virtues merely from the poignancy of taste, as that often is deceitful. Thus Ipecacuana, a medicine of active powers, has no smell; as to taste, it is very often latent, and not found till long chewed. On the contrary, the Cress kind, though of considerable poignancy of taste, are endued with very little medical powers, at least not with a *vis maxima*. However, as the want of odour, or taste, rejects the supposition of medical virtue, we may, on the whole, conclude, that those which possess them, have more or less of such; the difficulty is to ascertain the degree.

* Some of these enter into our food.

With regard to odours, I find this very difficult, as they are of such infinite variety, and of so little resemblance, as makes it very difficult to reduce them to any general heads; so that thence we might derive particular virtues from the different kinds of them. Linnæus has attempted a distinction of this sort. The simply fragrant, as the Violet and Wall flower, &c. the *ambrosiaca*, as the *asperula*. By *ambrosiaca* he means somewhat of a musk odour, and gives us another example, the *malva moschata*; which, by the bye, I take to be an evidence of very strong odour, being accompanied with little medical virtue; for this plant is of very inert qualities. Another odour he mentions, is the aromatic, comprehending under it Thyme, Lavender, Saffron, Cinnamon, Sassafras, &c. all these are of a distinct odour, and any resemblance they have, is found not to be supported by their virtues in medicine, which are found by experience to be very different. Besides these, there is a kind somewhat betwixt the fragrant and foetid, which I would call the *graveolenta*, such as that of Cummin, Coriander, &c. The more directly foetid are as much to be distinguished from each other as the aromatic, *i. e.* the difference of the Rue, &c. is very different from the stupifying odour of Tobacco or Opium, &c. &c.

Upon the whole, very little of the medicinal powers are to be determined from the odour. Some degree of it indeed, may be determined from a very strong one, though even that is often fallacious.

Linnæus's other general rule, *Sapidæ et suaveolentes bonæ sunt; nauseosæ et graveolentes venenatæ sunt*, will be found often to be false; nay, in many cases, the reverse. Thus, almost all the Lily kind, which are certainly *suaveolentæ*, are poisonous, as also the Jasmine; and on the other hand, the nauseous and foetid are often without any dangerous powers, while those altogether inodorous often possess them. Linnæus also pretends to say, that *sapida non agunt in nervos, nec olida in fibras musculares, &c.* This depends
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on a nice, physiological distinction, and if, as I think, the moving fibres are continuations of the nerves, or at least intimately affected by them, what acts upon the one, will certainly do so on the other.

Linnæus's next aphorism, *Ambrosiaca analeptica, Fragrantia orgastica, Aromatica excitantia, Tetra stupefacientia, Nauseosa corrosiva*, is very difficult to understand, and, were it necessary to comment upon it, might easily be shown to have little foundation in nature.

So much with regard to Smell. Taste is of considerable more use than Smell in determining the virtues *a priori*. Authors on this subject have generally stopt at generalities. Linnæus is very imperfect upon it. Our countryman, Abercrombie, has also touched on the same subject; but from Sir John Floyer's Treatise, though at first attempted with imperfection, I find I am able to draw the most useful hints. Having then spoken on the subject of System and Quality so far as regards Odour (of which having said enough) I go on to

T A S T E.

Taste labours under the same difficulties as Odour. The perceptions from the same impression vary in Smell remarkably, in Taste considerably so. There is not only the same difference of what is grateful to one being not so to another, but also a difference with regard to impression, what is acrid to me being almost insipid to another. It is not with regard to sweet and bitter, &c. that men differ, it is with regard to compound tastes, in expressing which there is no small difficulty; but as this subject leads farther than any other to the knowledge of unexperienced substances, I shall attempt, as a foundation for observations afterwards to be made upon it, to give somewhat of an arrangement of Tastes.

1. *Insipid*. This is of three kinds: The watery, mucilaginous, and oily; in all of which we judge properly of the consistence, and not of the impression or Taste. Of the Tastes that produce sapidity, I shall first take notice of one in common to the whole vegetable kingdom, *viz.* the 2d, the *Herbaceous*. In many plants we have this perception, joined with many others, so that, however, the herbaceous lurks under the whole, and in common to the whole plant.

Sometimes again it is *simple*, as in Chickweed. The herbaceous is frequently mixed with more or less of the oily, poignant, saline, called a nitrous taste, as in raw Beets, and Spinage. Another difference of it belongs to the *Legumina*, called the Pea Taste, found in the leaves of Pease and other *Legumina*.

3. *Acid*. This is simple and pure, in some fruits of a watery consistence, as Oranges separated from the rind.

4. Next to this is the Austere, or Styptic Taste, as that in galls, or the barks of trees: In which last it is as fundamental as the herbaceous Taste in vegetables. *Acerb* is often confounded with acid or austere, but it is properly a compound of both. All fruits in their unripe state are acerb, some of them always remain so, as Sloes. Between the acid and acerb there are intermediate degrees. Lemons have a degree, *e. g.* of austerity along with their acid.

5. *Sweet*, *e. g.* *Sugar*. This is seldom pure, and commonly united and confounded with acid, as in the *acido dulces*: And that again has commonly somewhat of acerbity along with it. Sweet is also united with austere, producing what Floyer calls the Fern Taste. This is obvious in polypody, ferns, &c.

6. The next simple Taste is *the Bitter*. This is seldom pure, often confounded with acrimony, aromatic, or austere. To me an instance of the pure Bitter occurs in Genian.

7. The

7. The *pure Acrid* is difficult to find. An example occurs in Guinea Pepper. When an acrimony is joined to fragranciness of odour it is aromatic. This is more or less pure. Cinnamon is an instance of the purest aromatic. When an acrid is joined with a disagreeable odour, it may be called foetid or nauseous. Some, however, take the nauseous as a simple taste, an instance of which is given in Opium, which is neither bitter nor acrid.

These are all the simple Tastes. Various are the Tastes compounded of these; the austere bitter of Rhubarb; the aromatic bitter, as in Orange or Lemon peel; the nauseous bitter, as in *Assa Fœtida*; the peculiar bitter of Floyer, which he calls the smoaky or sooty bitter, and Naturalists the *amaro frigida*, as Lettuce, &c. the Laurel bitter, which is commonly enclosed in shells, as bitter Almonds, kernels of black Cherries, &c. the balsamic or terebinthinate bitter, as that of Turpentine, Resins, &c. are examples of compound bitters, and probably the foundation of all their varieties.

Instances of compound Acrids occur in the bitter Acrid, as *Curcuma*, the nauseous Acrid, which is commonly purgative, as Seneka, in chewing of which you have a succession of Tastes, insipid, sweet, nauseous, acrid, which commonly, as I said just now, serves to distinguish purgatives.

Compound aromatic Tastes occur in Ginger. Cinnamon, I have said, is purely and simply aromatic; in Ginger the acrimony is more evident with less of the *aroma*. It is thus we distinguish between the acrid aromatic and the aromatic acrid.

The Cress and Garlic Acrids occur in Cresses, Garlic, Onions, and others of the Class.

This list of Tastes is very far from being complete. However, I found it necessary to give it, in order for a foundation for more accurate distinctions, as they are the leading experiments of judging
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by analogy. On the whole, the virtues of substances accompany pretty constantly and regularly their peculiar Tastes, especially if they are simple. In compound Tastes we ought always to hesitate, for the virtues of a medicine are often found to reside principally in a very small proportion of sapid substance, which, amidst the confusion of other Tastes, will often discover itself imperfectly and obscurely, if it is not hid altogether. As to the simple Tastes, the pure austere is astringent, the sweet nutritious, and the pure bitter of the same virtues with the rest of the kind; but more of this shall be observed afterwards, when I come to treat of particular substances, which in my Catalogue I have sometimes arranged, according to their uniformity of Tastes.

C O L O U R.

Linnæus has taken in Colour, as varying the virtues of Medicines. His aphorism is this, *Color pallidus insipidum, viridis crudum, luteus amarum, ruber acidum, albus dulce, niger ingratum indicat.* All these of Colour is less useful than the Odour, much less so than the Taste, and is very far from being general.

Luteus amarum indicat. I formerly observed, the lactescent plants, and even such as were of milky consistence, were often poisonous, and had a degree of acrimony and bitterness with them. If Linnæus, then, had said, that the yellow juices of plants were bitter, or acrid, his rule would have been much more general. The yellow Plumb is an exception.

Ruber acidum. This is not founded. It is applicable only to fruits, which, in proportion to their redness, have often their acerbity turned to an acid; for many flowers are red, which have no acidity. Several plants which are of a green colour are acid, as Sorrel, &c. but these Linnæus says are only such as turn red in autumn. But surely the *Brassica*, which is of this kind, has in it no acidity, &c.

Viridis

Viridis crudum. This observation is only relative, being applicable only to fruits, which, in the progress of their growth, change their colour with their maturity.

Pallidus insipidum. This is a still greater mistake, for pale plants are far from being generally insipid. Linnæus means here those plants which, being naturally green, attain, by blanching, a white colour.

Albus dulce. This rule is relative to fruits. Thus the white currant is sweeter than the red. Whether it applies to apples, plumbs, rasps, &c. is a question. Certain it is, that the red plumb is as sweet as the white, &c. This rule, as well as the rest, is of very little use.

Niger ingratum. This is far from being conclusive, although when a general rule of this kind leads to an important caution, it ought to be observed. Black currants, in contradiction to it, are equally harmless with the red.

This finishes what I had to say on the sensible qualities. Another method of examining and detecting the virtues of plants is by their chemical qualities.

C H E M I C A L Q U A L I T I E S.

From chemical investigation much has been expected; but it is now known little can be obtained. The first means of applying Chemistry to this purpose, is by the distillation *per se*. It is now known, that the matters hence produced, are the same in all plants; their proportion only being different in different substances. It serves, however, to distinguish between animal and vegetable substances; the first giving a volatile alkali, the second an acid, in the first part of their distillation. The *fungi*, however, and esculent mushrooms, according to Geoffroy, give out a volatile alkali in the first part of the distillation. If any other such be found, we may conclude them

them among the more putrescent vegetable substances, and of peculiar qualities. Chemical analysis may be employed in such a case as the following, *viz.* of an expressed juice presented to us, which has come from abroad. If such give out a volatile alkali in distillation, we may conclude that the substance was very nearly animal, or, indeed, what is more probable, that it had undergone the putrefactive process in transportation. With regard to the acid of vegetable, I do not know whether it will bear any application; for not only is it varied in different vegetables, but also is not regular, that is, in any determinate proportion to the virtues of the recent plant, that which in its fresh state has least of it, affording sometimes most in distillation. The quantity of volatile alkali is also much diversified, but from these I am of opinion we might determine the different alkalescency of animal food.

If time were allowed me, it is very possible I should go through a great number of distillations, in order to determine what influence the difference of proportion might have. The experiments of the French Academy are not properly compared on this subject, of the proportion of different principles by chemical analysis. 1. With regard to spt. rector. some have given it without decomposition, and allowed it to pass over unnoticed into the receiver, or allowed to mix indiscriminately with the other parts. 2. Acid is grossly estimated from the proportion of water; whereas in all cases it ought to have been determined from a further rectification. 3. Alkali is still more imperfectly computed, being never estimated but in so far as it appeared in a solid form; whereas some of it is always in the phlegm, and some of it united with the acid into an ammoniacal salt. Neither, 4. with regard to the oil is the estimate fair. They have always neglected that which is in the charcoal, whose blackness, &c. is often owing to this, and, in my opinion, the diminution it suffers of weight in the open air, may always be reckoned as so much oil of the subject.

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Upon the whole, although this subject had been properly executed, it is uncertain what inferences might have been drawn from it; but, as the matter is at present, in talking of medicines I shall always neglect it.

Another less violent Chemistry has been proposed by Lemery, *viz.* Fermentation; but that, in my opinion, would as much alter our subjects as Fire.

Another method of investigation has been proposed from the Essential Salts; but this has been so little followed, that I do not know what can be drawn from it; and indeed they generally arise from a decomposition: However, if they be in very great proportion, some judgment may be formed, as, *e. g.* a large proportion of Sugar may be inferred nutritious.

Lastly, Solution and Extraction by different *Menstrua* has been proposed, but I am afraid on as weak foundations, for discovering the virtues of remedies, as any of the former. The *Menstrua* used are commonly Water and Alcohol. The resinous parts extracted by the Alcohol are ordinarily most active, although this is far from being general, as the gummy often are so. But this, as leading to, and being the foundation of, the pharmaceutical treatment, I shall always insert from the best Authors, and give observations in consequence.

A D S T R I N G E N T I A.

The distribution of particular substances I have formerly explained: The different Medicines were distributed according to the indications, and, if these were one and the same, according to their common operation on the human body. The order of the several indications was this: 1. According to their operation on the Solids and Fluids. The operation on the solids is divided into two kinds; first, as they act on the simple solid; secondly, as on the *solida viva*, or the organs of animals, whose properties disappear with life.

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With regard to these generalities, I need not hint that it is impossible absolutely to be correct, for there is no distribution which is not liable to very great difficulty: We have, however, given that which to us seemed the best, for in the beginning of study we ought to acquire general propositions, afterwards finding out exceptions, or applying them to particular cases. We now begin with those Medicines which act on the simple Solids: These are of two kinds; first, as they increase; secondly, such as diminish the cohesion and strength of the simple Solid. Those of the first kind are what are strictly Astringents, called also Constringents, Styptics, Tonics, Roborants, &c. as we have formerly mentioned: This is the simplest view of them, and what we must here necessarily take. With regard to this, as well as all other heads, we shall endeavour to show their manner of action on the human body, the diseases in which they are required, the particulars wherein they are hurtful, in what manner their virtues are discovered to be present, and along with that the particular part or parts in which their virtue resides, which leads us, lastly, to the Pharmaceutical Rules for their Extraction.

As to the Operation of ASTRINGENTS, some people have imagined to themselves a very simple theory. Animal Fibres they supposed or considered as composed of solid earthy particles, adhering together in a line, by means of a gluten composed of water and oil; *vide Boerhaave*. Now, with regard to increasing the Cohesion of the Fibres, it may be supposed to depend on the proximity of the particles. If then we insinuate between each particle another of the same kind, we increase the Cohesion of the Fibre, and in this manner have Astringents been supposed to act. This theory is very uncertain, and there is no instance in other parts of Nature, of increasing the Cohesion of Bodies in this manner: Even in the Coagulation of Fluids, which is analogous to this, we cannot certainly say it is performed by the interposition or insertion of particles of another of the same kind. Some appearances, however, seem to contradict this: Thus the Coagulation of White of Eggs by Spirit
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of Wine may be supposed to be by the insinuation of the particles of the Spirit of Wine between those of the Albumen, and so attracting them to each other. To me it seems rather owing to a decomposition, the Spirit of Wine attracting the Water, and so the solid parts running together. Coagulation seems to be a decomposition, or a detraction of some parts, in the same manner as a fluid volatile *alkali* forms with Spirit of Wine an *Offa Helmontii*, by attracting the water of the volatile *alkali*.

A simple fibre, then, being composed of fluid and solid, the cohesion of the whole may be encreased, by diminishing the watery substance, or by addition of solid. It appears to me, that Astringents act more in the first way, by exsiccating or absorbing the fluids interposed. Thus the operation of tanning, which is entirely analagous to this, is carried on almost entirely by abstraction of fluids. So much for the action of Astringents on the simple solid fibres. I must now observe, that it is impossible to keep to our first resolution of separating bodies, which act on the simple solids, from those which act on the moving fibres. Astringents, then, must have a double action, first, on the simple solid; secondly, on the *solida viva*, or the fibres of living bodies. If the action was only on the simple fibres, it must be confined to the part, to which the substance was directly applied, by absorbing its fluid, or increasing its solid parts; whereas we see the effect propagated to the rest of the body. Thus, Alum applied to the tip of the tongue, does not stop in its action there, but, independent of diffusion, induces cohesion and corrugation over the whole mouth. If then Astringents taken into the stomach extend, in a short time, their action over the system, I maintain it is owing to their effect on the moving fibres. If then we look to an Astringent's action on a particular part, and then its operation over the whole system, it is inconceivable, and almost impossible to alledge, that the dose can be so divided, as to be conveyed to every particular part, or, far less, to the morbid part. We must, therefore, suppose some other reason, and the effect on the system is in consequence

quence of the universal sympathy of the stomach; as when we give an Astringent internally in an Hæmorrhagy of the *Uterus*, it is impossible that a small portion of an Astringent can be so divided as to be carried there, far less that the whole of it should be so, to produce this effect. The propagation of virtues, then, as all other effects on the nervous power is scarcely explicable, but as innumerable instances of it occur, we must admit it as a fact.

Hitherto we have only considered Astringents as acting on a particular part, but they also may be considered in different lights, *e. g.* certain Stimulants may be astringent. These encrease the contraction of the moving fibres, and are either tonic or clonic, producing a simple contraction which remains, or alternate oscillatory motions. If such then as produce only that simple contraction exist, they must be Astringents. Of this I shall afterwards speak under the head of Stimulants. There is another view in which Astringents have been taken, *viz.* that of stopping encreased evacuations. Whatever diminishes these, must be Astringents; and it is almost impossible to separate the stopping of Evacuations, from the operation of Astringents in this view.

This introduces some confusion, as the means of stopping Evacuations are various; 1. Encreasing the contraction of the lax simple fibre; 2. Of the moving fibres; 3. By lessening the impetus of the blood on a particular part. Here, then, Sedatives are Astringents, and Astringents Sedatives. Sedatives operate either by diminishing the influx of the nervous power, or its mobility, and so are what is called refrigerant. In this view farther, then, as Evacuations depend often on too great influx of the nervous power, and that often on mobility induced by acrimony, Demulcents may be astringent, as sheathing the acrimony. There may be farther means of stopping encreased Evacuations that may be referred to this head. All Obstructions may depend on two causes; either a Contraction of the Solids, or a Coagulation of the Fluids. If any medicines be introduced into the body, which coagulate the fluids, they are certainly Astringents.

So

So much I thought necessary to say on the different views in which Astringents may be taken. We now go on to consider

The DISEASES in which ASTRINGENTS are indicated.

These naturally follow from what we have been saying; 1. They are indicated in laxity of the simple solid. This is the object of their operation, which has been most commonly considered. However, I have a doubt whether this laxity so often takes place as is imagined; for the state of the simple solids seems permanent and fixed, or varied so insensibly and slowly by the age of the animal, that for the course of a year, far less that of months, &c. we can conceive very little change of laxity or rigidity of the simple fibres produced, or, indeed, remedied, in the same time. Wherever we see weakness, we deduce it from laxity of the simple fibres, but this never occurs, except in very few instances. These, I think, are scarcely more than the following, *viz.* application of Emollients in over proportion to a particular part, an overflow of moisture, as the dissolution of even the bones by the Rickets, or an overstretching, destroying the tone of the part. These, however, are but rare cases, and such laxity of the simple solids as is commonly imagined, I can neither suppose or believe; so that this indication from the laxity of the simple solids, very seldom takes place. I think Astringents seldom act by restoring this cohesion: I admit, indeed, that they do externally in topical application; but with regard to internal action, I cannot conceive them capable of being applied to the ultimate fibres in the common course of circulation. Nor, indeed, can I easily suppose this distribution through the sides of a small artery, whose sides again are supposed to consist of these, disposed along its sides, &c. To me, the Nerves seem the ultimate fibres of the human body, through which a fluid is distributed by filtration along their substance, in the same manner as in vegetables; so that in this view, a very small proportion of Astringent may produce a very great effect.

2. Astringents

2. Astringents are indicated in debility of moving fibres. This manifestly often takes place, and may be induced in a month, or a moment, for the motion of the nervous fluids may be arrested by the least affection. These are the cases where most universally Astringents are necessary, and in which they most commonly act.

3. Astringents are indicated in increased action of the solids. I explained before how an increased action of the solids may depend on irritability, and not on increased strength. In all these cases, where increased action depends on the irritability or mobility of the part, Astringents act by diminishing the impetus of the nervous fluid, and so taking off the increased irritability and increased action. As spasmodic affections often arise from increased mobility or irritability, Astringents, as taking off these, have been reckoned Antispasmodics.

4. Astringents are more universally indicated in increased evacuations depending on laxity of the simple solids, or mobility and irritability of the moving fibres, in which last case their action has been commonly confounded with their action on the simple solids.

5. Another indication is, when Astringents have been employed, as in the case of wounds. There is no term more frequent than that of Vulneraries, which are commonly Astringents. I said formerly, that most Vulneraries were built on an imaginary foundation; but considering the matter more nearly, I now see a case, where they may be used in some such view, *viz.* in those ulcers which are consequent upon wounds. It is but a late discovery that internal medicines promote the formation of *pus* in ulcers; for this purpose the Peruvian Bark has been effectually employed, which I constantly consider as more or less of an Astringent; for in other cases where Peruvian Bark is used, as in fevers, &c. other Astringents have been successfully substituted, so that I imagine in them somewhat of a common virtue, and hence we may suppose, that our Astringents, as well as the Bark, may be favourers of sup-
puration

puration in wounds, and that we may, in some measure, restore the term of Vulnerary.

D I S E A S E S, or C A S E S, where they are contraindicated.

1. They may be hurtful by inducing too great a degree of constriction in the system, and thus have I known a sense of fulness brought on by their use, which must either depend on an over quantity of fluids in proportion to the solids, or on a constriction of the solids.

2. Excess in the use of Astringents may destroy the mobility of the moving fibres, and it is from this effect that they have perhaps been justly accused of a deleterious poisonous quality, bringing on palsies, &c. and weakness and flaccidity may as well appear from taking off the mobility too much, as by any other means. These effects appear in the suppression of the natural and necessary excretions; so that in the use of Astringents, we should never proceed so far, as to hazard the stoppage of these. I formerly mentioned one principal use of Astringents to be in stopping encreased evacuations. Here, by the use of Astringents, if we proceed carelessly, we are apt to run into extremes; and there is nothing more difficult in the practice of physic, than to judge the degree in which Astringents are to be given, without injuring the healthy evacuations, as well as the kinds which are proper. *Materia Medica* writers are very imperfect upon this head, and commonly under each Astringent, they tell us it is anti-dysenteric, and a medicine for the *diarrhæa*, &c. but they always ought to have added these two cautions; 1. That Astringents never ought to be employed where the morbid stimulus or acrimony, which produces or continues the disease, has not been previously evacuated; for then occasion is given it to ferment, to multiply itself, and assimilate other fluids to its nature, which will cause the disease to return with accumulated violence; or, if the Astringents have been so strong as to prevent this effect, it will cause the acrimony to fall on other parts of the system; perhaps with more dangerous consequences. This general rule requires some
nicety

nicety in the application. Too great an attention to the acrimony is not always necessary.

Another view of this matter is, that these encreased evacuations often depend on a determination of the fluids to particular parts, as in a plethoric habit to the nose, uterus, or lungs, which may be established by laws of the system, or by habits which are equal to these laws. If then we use Astringents here, we may perhaps lose our labour, or, which is of more importance, by suddenly stopping the flow of fluids to these vessels, and so suddenly changing the balance, a determination is made to places of more consequence, where disease is of more danger.

Evacuations often take place also, in consequence of a constriction of the surface, determining a greater flow to the intestines. There is no method of remedying this, but by giving way, in some measure, to the evacuations, or causing the determination some other way, and till this be obtained, Astringents ought never to be used. If their determination have not continued so long as to establish a law, then we should endeavour to return it by the skin, its proper emunctory.

These are the chief cautions in the use of Astringents. There are still two others. One arises from this observation, *viz.* that although I have said that Astringents, when taken into the mouth, extend their action over the whole system, yet that their effects must be greater in the *primæ viæ*, to which they are immediately applied; so that in the exhibition of Astringents, we must take care not to suppress the natural evacuations, while we only endeavour to check the morbid. Another caution is, that in all these cases, where these Astringents are to be employed as Roborants, they ought to be thrown in only in small doses, and at proper intervals; for in this indication we only intend to give such an astringency, as by encreasing the strength of the vessels, they may be enabled to propel their fluids properly. Thus when we use Wine as an Astringent,
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we must observe this caution; for if we give it in large quantities, such a sudden constriction may be induced as entirely to counteract our intention. We now go to the

MEANS of discovering the VIRTUES of ASTRINGENTS.

1. One method of knowing Astringents is by their experienced effects in arts, particularly in the art of tanning leather. Several Societies have been employed in finding a variety of substances, which may be employed in this way; and have accordingly produced a large list of vegetables employed, or which *may* be so, in this way, besides the oak bark. We may allow that all the plants which are found in those lists, may be concluded Astringents, and in proportion to the effect they had in the tanning process, may we infer their astringent virtue in animal bodies. Here, however, a caution is necessary; for such substances, besides their Astringency, may often be accompanied with other matters, which may render their use noxious. Perhaps it may be said that several of the substances, given by those Gentlemen in their lists, were employed on a previous knowledge of their Astringency; but this does not contradict what we have said of substances which answered in tanning, being capable of being used as Astringents, if they possess no other noxious quality.

2. Another method of discovering Astringents is by their decoctions, which, thrown into a solution of green vitriol, strike a black colour, and form an ink; and those substances which thus give the blackest ink, provided they are not accompanied with any peculiar acrimony, which discharges their use as Astringents, may be reckoned the strongest and best.

3. Astringents are discoverable by an austere, or acerb taste. Some are endued with an odour, but this is a separate matter, accidentally accompanying them, and adds nothing to their astringent virtue; for true and pure Astringents have an acerb, austere taste,

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without odour; for when the odour is great, and joined with other substances, we must reject their use as Astringents.

PARTS of VEGETABLES where ASTRINGENCY is lodged.

I think the *austere* Astringents are lodged universally in the solid parts of vegetables, most commonly in the bark, frequently in the woods, and sometimes in the roots, and indeed I imagine there is an Astringency in the solid parts of all vegetables, and that in most it is only accompanied with other parts which prevent our perceiving it. The *acerb* Astringents are found in the fluid parts of plants, and that commonly in the juices of unripe fruits, or perhaps in other unripe juices of plants. The Chemists have gone further in ascertaining where the astringent part is lodged. They alledge, perhaps with some propriety, that it always resides in the earthy parts, which they have supposed, in order to form this Astringency, to be joined with an acid. In the *acerb* Astringents some acid is found, but in *austere* Astringents none such has been found, even on chemical trials, and these are indeed substances which themselves attract acid. In what part the astringent virtue resides is uncertain. Here, however, I may observe one fact, namely, that all Astringents act more powerfully in substance than in decoction, or any other method of preparation; for our stomach has powers of solution, which out of the body we cannot imitate. Here saline Astringents are excepted, *e. g.* the vitriols, for it is indifferent in what form they are introduced. It is, however, often necessary for the more convenient exhibition, to extract our Astringents, and employ them in a fluid form, which leads me to the pharmaceutical treatment.

PHARMACEUTICAL TREATMENT of ASTRINGENTS.

By Newman's and Cartheuser's Experiments, it appears, that Astringents are equally soluble in water and alcohol. They say a spirituous menstruum is best, and that though water extracts more,
all

all is not astringent which is extracted, but much of other matters adhering. The proof of this, say they, is, that the residuums of both are equally insipid. That a spirituous menstruum does it most properly appears from this, that whatever water takes up when boiling it deposits a part of it when cold. This leads us to a rule in the exhibition, *viz.* that all our astringent decoctions should either be given when warm, or agitated well together when cold.

I am now to speak of particular Astringents. These I have referred to two heads of *Fossile* and *Vegetable*; absolutely of different natures.

F O S S I L E A S T R I N G E N T S.

These are subdivided into three Classes: The *Earthy*, *Saline*, and *Metallic*.

I. E A R T H S.

These are a set of substances, which formerly entered into the *Materia Medica* in a considerable number, but of late this number has greatly diminished, and very few of them are now employed. All of them may be reduced to these three heads: *Bole*, *Clay*, and *Absorbent Earth*. In the distribution of Earths, Naturalists have hitherto been pretty much divided. Those who are averse to employ the chemical qualities in Natural History, have sought for other marks to distinguish them. Thus Dr. Hill, and some others, have distinguished them, according as they are more or less diffusible in water, into *Boles*, *Marles*, &c. But this being only a difference in degree, is not a proper distinction. Whatever this may be in Natural History, certainly in Medicine the division into Absorbents, and those which are not so, is much more convenient. Of the non-absorbent are the Boles and Clays, of the last kind the *Absorbent* Earths, of which I have given *Osteocolla* for an example.

BOLES.

With regard to the term of *Bole*, the application of it has been various at different times. The Boles of the Ancients, *e. g.* the Boles of Galen, seem to have been our absorbent Earths; whereas the Boles we employ, are not Absorbents; for they are neither soluble nor effervesce with acid in the cold. Their variety is very considerable, but we need only make one distinction of them, that those of the greatest purity are best, and only fit to be employed. They are frequently adulterated; for our Druggists seldom take the trouble of bringing Boles from Asia; for we have Boles at home of the same quality and virtues, only wanting their colour, which we give them, by making a mixture of the purest white Clay and red Ochre, which, however it may be a fraud in trade, answers equally well in Medicine. We have been retrenching the Boles; for my part, I think we might altogether reject them. Their virtues are very inconsiderable. Applied to the tongue they give a certain rough taste, and appear astringent. But, in my opinion, it is only an exsiccating quality, drinking up the moisture of the tongue, for when pure Bole is diffused in water no such taste is observed. With regard to Earthy Medicines, which are not soluble in our fluids, little effect can be expected from them; and in order to render them fit for medicine they must be previously combined with acids, either by *nature* or *art*; or if intended to exsicate, they must be given in such a monstrous quantity as entirely to overload the stomach. As to Boles they may contain several other substances, which may make them act more powerfully as Astringents; *e. g.* Iron, which most of our red Boles contain. Perhaps they are already combined with an acid, or if not may be dissolved by that in our stomach, becoming in this way medicated. Many also contain Alum, and on this account may be medicated substances; but in these cases it is only on account of the Vitriol and Alum they contain, and certainly it would be much better to use these substances by themselves, than in such an uncertain manner as they must be in those combinations.

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I forgot to mention, that Boles were hardly dissoluble in acids, except when very concentrated or assisted with much heat, and the Earth of Alum is now known to be furnished, by every Bole and Clay, which may be extracted by every acid, even the weak vegetable, and so likewise by the acid in our stomach, in which view likewise they only act as Alum.

Another virtue has been attributed to them, chiefly I believe on the authority of Van Swieten; viz. that of absorbing Alkalis, which is deduced from their supposed power of stopping the Dysentery. But upon frequent trial I have found them to answer no better than calcined Hartshorn. Let us consider this theory. He says, that, as containing a vitriol, they contain a vitriolic acid, of which part may be got by distillation. This, however, is very inconsiderable: I have not yet tried how far they may be considered as Antiseptics, in the manner of Dr. Pringle's Experiments.

C I M O L I A.

This, like other terms, has been left undetermined. As it stands in our Dispensatories, it implies a pure white pipe Clay, and the *Cimolia purpuracea*, a Fullers earth. These are more purely argillaceous than Boles, and freer of any foreign matter. Their effects in Medicine were never remarkable, and they are now disregarded in present practice, though as possibly they may furnish aluminous matter, they may act as Astringents.

O S T E O C O L L A.

I have set down this as an instance of Absorbent Earths, many more of which will be found under the title of *Antacida*; I am here only to consider them as Astringents. Osteocolla is a calcarious earth, which has been suspended in water, and afterwards deposited and concreted in a powdery form, on different substances, especially the roots of plants, and, from the other matters being separated by putre-

putrefaction, or otherwise, called *Ostocolla*, from its then being like a hollow tube. Hence also it was employed in the cure of fractured bones, and hence, probably, too, the supposition of Absorbent Earths being astringent. In no one instance do I think this is well founded. With vegetable Acids they even form a laxative substance, nor to the taste do they shew any austere or styptic quality. Formerly we employed an animal Earth procured from bones, &c. especially *Hartshorn*, which was, when calcined, particularly used in astringent decoctions, as the *Decoctum album*. Here I shall observe, that this is an insoluble substance, hardly yielding to Acids, and only as uniting with Acids do earths seem to act in the human body. Instead of calcined Hartshorn, we have introduced into the *Decoctum album*, Chalk and Crabs eyes, though I am afraid on no very good foundation, as Chalk, united with Acids, has no astringent quality, but is rather laxative. Besides, Dr. Pringle has found them to have a septic quality, viz. by absorbing the acid in the stomach, &c. which, in some measure obviates the putrescency. If, instead of these, we were to throw in a *Cimolia*, no such effect would be produced; for all clays contain an aluminous Earth, which, although it extracts the Acid in the stomach, yet with this forms an Alum, and thus acts as an Astringent. However, on the whole, I believe the calcined Hartshorn preferable to Chalk, &c. which we now employ, for although it unites sparingly with acids, yet part of it is still corroded by them, and acts as an Alum.

S A L I N E E A R T H S.

The chief, and perhaps the only one of these, is Alum. This is a substance with whose chemical history we are but lately acquainted. Formerly it was supposed the vitriolic acid in Alum was joined to a calcarious earth, and this perhaps, as well as the reasons before given, contributed to give rise to the opinion of calcarious earths being thought astringent, when joined with acids. But we now know that clay is a compound earth, part of which may be
united

united with acids, and that it is with this part and the vitriolic acid, that Alum is formed.

Alum is found native in a fine fibrous form, called then *Alumen plumosum*. This is so scarce as to be mistaken for *Amiantus*, which often in our shops is substituted for it. For the most part, Alum is extracted by art from earths, in which nature has lodged it, viz. from *pyrites*, *slates*, &c. Extracted from *pyrites*, &c. it is called *Alumen rubrum*. Alum is of two kinds. The first is a pure transparent Alum, the Alum of the northern Countries. The second is of the same nature, with reddish streaks in it, called Roman Alum, as brought us from *Civita Vecchia*. Wherein the difference of these two consist, I do not find that chemists have determined. The manufacturers certainly find one; the Roman Alum with Dyers answering purposes which the English will not. Physicians, too, think the former better in medicine. As to the taste, it shows rather more stypticity, but this is inconsiderable, and I make no doubt, that, for medical purposes, the common Alum answers equally well with the Roman.

V I R T U E S of A L U M.

From experience, Alum is found to be a powerful Astringent, and perhaps one of the most safe. Being readily dissolved, it acts quickly, and is one of those Astringents, which extends its action over the system; its effects appearing much sooner than we possibly could suppose them to be, (in consequence of the circulation) in the part affected. It acts more quickly, and in a smaller dose, than the vegetable Astringents, and is less deleterious, less stimulant, and of more general use than the metallic. Alum is one of those Astringents which we can most conveniently employ externally. It is often employed in Inflammations of the Eyes. Alum not only contracts the fibres, but diminishes the mobility, so that it here acts in two ways, by correcting the laxity of the vessels, and at the same time diminishing the impetus of the fluids. The white of egg, with which it is commonly

monly joined for this purpose, has been thought to have particular virtues, but in my opinion it has no other in this case, than that of giving consistence, and contributing to more convenient exhibition. Alum is also used for bracing lax and flaccid gums in scorbutic habits, for which purpose the vegetable Astringents have little effect, and the metallic, on account of their bad taste, strength, &c. are improper. Alum is applied with advantage in inflammations of the throat, and *anginas*, where there is much laxity. Sydenham here formerly proposed the vitriolic acid alone in strong doses, but besides the too great strength of his doses, the vitriolic acid, mitigated by the earth in Alum, answers much better.

Externally Alum has been employed to dry up excessive excretions of the skin, as sweat in the armpits, with success. But here I need not repeat what I have said formerly about the drying up such excretions at all.

Internally it is used in Hæmorrhages as an Astringent. In hæmorrhages of the *uterus* it is the substance we can most depend upon. For this purpose it is generally employed in the *Pulvis stypticus*. The *Sanguis draconis*, with which it was there joined, has been imagined an Astringent, but to me it seems to have very little of that power, as not being soluble in our fluids, and I think an improvement is made in the last edition of the *Pharmacopœia Pauperum*, in substituting for this the *Terra Japonica*. We have lost the original intention of Helvetius in addition of the *Sanguis draconis*, viz. that of forming the Alum into pills, which is often required for more convenient exhibition. It is done by melting the *Sanguis draconis* on the fire, and mixing with it a proper proportion of Alum, and this is the only means of reducing Alum into this form, and the only proper use of the *Sanguis draconis*.

Alum may be employed in all cases where Astringents are used. In *diarrhœas*, &c. it has been little used, but here it might not only act by bracing the intestines, but as an antiseptic, especially if exhibited in small doses.

Alum

Alum is also employed in Intermittent Fevers, as I myself have seen with success. When joined with aromatics, as nutmeg, and given before a fit, I have seen it entirely prevent it. Astringents have also been used in Continued Fevers, and here Alum is preferable to the metallic astringents.

D O S E of A L U M.

For different purposes it has been used in different doses. The highest is ʒß. In this large dose it excites vomiting. It is seldom, therefore, adviseable to give it in such quantity, and doses of gr. x. will answer better, repeated at half an hour's distance, or an hour, and in this way have I seen it given to the length of ʒj. without vomiting, &c. and I have been told of instances where it has been carried further. In hæmorrhages, where astringents are used, which should be when they are very violent, our intention ought to be to moderate, not to suppress the flux; so that in this case the less dose of an astringent medicine we use the better.

L A P I S H I B E R N I C U S.

This is a peculiar slate. Most of the slate kind contain Alum, which we know by their being deliquescent and mouldering in the air, which depends on their containing the matter of *pyrites*, whence Alum may be got. Wherever this slate has any of the aluminous taste, we may employ it as a medicine; but Alum itself is much preferable, as we can ascertain the dose; for here we must give our *Lapis Hibernicus*, encumbered with a load of useless earth, and therefore it is now properly neglected. The virtues ascribed to it scarce deserve our attention. It has been said to be used with success in contusions with internal hæmorrhagy. Here, indeed, it may act as well as Alum, but certainly that is much better employed; but in resolving contusions, neither this, nor any medicine used by *Materia Medica* writers, is fit for the purpose.

LECTURES ON THE METALLIC ASTRINGENTS. C O P P E R.

This is a metal soluble in our fluids and in any saline substance. It may be combined by chemistry with acids, alkalis, and neutrals. The combinations are all of the same virtues. If there is any difference, the combination with the muriatic acid is more astringent, and with alkalis in general more stimulant than with acids*.

V I R T U E S.

It is a powerful stimulant, very immediately and in small doses exciting vomiting, inasmuch as to make it difficult to exhibit it without this effect. Here, then, we have reason to be anxious in the choice of the preparation. We should mostly avoid the combination with acids, universally that with alkalis, and prefer the neutral salts. In the intestines, Copper acts as a purgative, and may be used with advantage in hydropic cases, not only on this account, but also on the diuretic quality it possesses when properly managed. Whether Copper exerts this diuretic quality in the *primæ viæ*, or by being assumed into the mass of blood, I shall not determine.

Copper, too, acts as an Astringent in stopping Evacuations; but we seldom can throw it in, without its stimulating effects. For this purpose, *Ens Veneris* was recommended by Boyle; but afterwards neglected. There has been a dispute among the Chemists, whether Mr. Boyle's *Ens Veneris* was procured from Iron or Copper. Boyle himself tells us, that he used a pure venereal vitriol, and besides, it is impossible to imitate the properties of the *Ens Veneris* by any preparation of Iron. This preparation is to be considered as a combination of Copper with an ammoniacal Salt, and sometimes with a portion of muriatic acid. This pre-

* The preparation from neutrals and particularly ammoniacal salts are much the mildest.

paration may be obtained in Chrystals in the following manner, *viz.* by adding gradually to a solution of blue vitriol in water, a volatile alkali, till no longer any cloud appear in the addition; after which, to the diaphanous liquor, pouring on as much alcohol as is sufficient to separate the water; after which, very elegant small sapphire coloured* chrystals will concrete. *Vid. Nov. Act. N. Curios.* tom. i. observ. 67. This preparation has all the advantages of the other preparation of Boyle's, and never has any of the Copper united with the muriatic acid. Wherever Copper is introduced in this form, it acts as an Astringent, and destroys the mobility of the nervous power, and so is very useful in that disease of universal laxity, the Rickets, as Boyle observes. It is also antispasmodic, and has been prescribed in the Epilepsy, as I myself have sometimes observed, with appearance of success; where its action would seem to depend on giving a tension to the system, and destroying that irritability on which Epilepsy seem to depend. Boyle also recommends *Ens Veneris* as an anodyne, when he says it acts without the inflammable qualities of opium, the restlessness, &c. produced. Experience, however, does not seem to confirm this.

Boyle recommends Copper in petechial fevers, with *subfultus tendinum*, &c. and found that it stopt these, and brought the fever to a happy issue. Van Swieten tells us of a preparation of Copper, which, immediately after taking, produces a *formicatio* over the whole body, without any of the bad effects which occur from the stimulating power of Copper, and that it is an efficacious medicine in the Epilepsy. The method of preparation of it has not yet been discovered.

Out of the body, Copper kills Worms; but from its stimulating powers, it is very difficult to exhibit it internally for that pur-

* By being chrySTALLIZED thus, it is freed from all adhering acid, and is rendered more astringent. *Vid. Dr. Ruffel.*

pose. A single drop of it, dissolved in a solution of *vol. alkali*, was found to vomit a child to whom it was exhibited.

In external use, as a stimulant, it acts as an escharotic, and, stimulating the vessels, brings on that degree of inflammation which favours good *pus*.

The ancients employed very commonly Copper in this intention, as a digestive in ulcers; but on the restoration of learning, Mercury being found out, was almost only employed for that purpose; and so has continued to this day. But there are certainly variety of cases where Copper is more proper than Mercury, and perhaps still other cases of ulcers, where another metal will answer better than either. I shall here mention one particular instance of a disease not known in the books of Physic, where the effects of Copper were remarkable. A disorder in this country appeared a good many years ago, with exulcerations of the mouth, and fauces, with ulcers in the tongue, about the anus, and in different parts of the body, resembling the venereal disease; but distinguished by the different sloughs of the ulcers*, by the different manner of its appearance, its want of infection from carnal communication, &c. Mercury in this disease was tried with no success; but Copper almost always effected a cure. I used a solution of Verdigrease, which, applied to the tongue, very easily cured the ulcers there, by inducing a good suppuration, but as more difficultly applicable to the tonsils, also less quick in procuring a cure. This then ought to prompt all Surgeons never to dismiss a difficult ulcer without trying this remedy.

D O S E of C O P P E R.

This cannot be ascertained properly, as some persons will vomit from an exceedingly small quantity. We can only say, then, that the doses should be small, and then, when used as an Anthelmintic, still smaller.

* Pinnated to wit.

As to the Preparations of Copper, set down in the Catalogue, their uses will be understood from what has been already said on Copper itself.

I R O N.

This is a metallic substance, which is of more frequent use than any other. It combines with most saline substances, and is dissolved by all acids. The vegetable acid, * however, only corrodes it, but extracts all the medical virtue. Iron, then, may be given in substance, as its medical virtue may be extracted by the acid in the *primæ viæ*. But this is always an uncertain method, as the dose extracted depends on the quantity of acid in the *primæ viæ*, and as sometimes so much must be given, as by its mechanical action to be productive of bad effects. It is always, then, preferable to have the combination made before we exhibit this medicine. With regard to the preparation of Iron in books of Pharmacy, no difference of virtue has been discovered by any experiments yet made. There may be, perhaps, some difference, if Iron is combined with alkali, but even here no experiment has proved it. All the preparations of Iron, then, turn upon convenience, or elegance. It is often wanted in a powdery form. Lemery's method for this purpose is the best, *viz.* letting water, about an inch deep, digest upon the iron filings, by which means part of them will be converted into a fine black powder, and more, if the operation is continued. This may be separated by shaking the vessel, when the uncorroded filings will separate. Iron combined with the muriatic acid, is the foundation of the tinctures in the shops, and suits every purpose to which Iron may be applied, *v. P. L.* It is very convenient as dissolving in alcohol, and making a sort of dulcified spirit of salt, which gives the combination a very fine flavour. However, the dose is here uncertain, as a part of the Iron precipitates in keeping. But then the same inconvenience attends other solutions.

* Vegetable acid is now found to dissolve Iron.

LECTURES ON THE VIRTUES of IRON.

Iron is purely astringent, without the stimulating qualities of copper, or the deleterious ones of lead. However, neither is it so powerful an astringent as the one, nor so powerful an antispasmodic as the other. The aperient and astringent preparations of Iron are the same, differing only in degree of virtue. In all cases of laxity and debility, and in obstructions and slowness, proceeding from these causes, Iron is employed, though other simple astringents might also answer the effect. Here we ought to beware of a sudden astringent, which may be attended with bad consequences, and, therefore, in exhibiting it in these cases, we should give it in small doses, and trust to length of time for a cure; and by this means we shall avoid those inconveniences, of which Physicians often complain in preparations of Iron.

Mineral waters often produce cures, which we in vain attempt to perform by the combinations in our shops; even although these waters contain nothing but Iron. This is manifestly owing to the weakness of the dose; in proof of which we find, that the strongly impregnated waters seldom answer so well, as those weak ones we commonly reject. Iron may be employed as an antispasmodic, and then must be used in small doses. Hysterical cases are those in which it is commonly used, and then sometimes bad effects attend its exhibition. Different reasons have been given for this. That given by Carthusius seems not without foundation, *viz.* that often in these cases there are obstructions of the viscera, which are confirmed by the use of Iron, but that if these are removed, it proves a valuable cure. There is another distinction which I would make between the Hypochondriac and Hysterical diseases, which influences our practice very much. The Hypochondriac disease often depends on a rigidity of the solids, is a disease of the habit, and occurs in the decline of life; whereas the Hysterical disease is often attended with a laxity of the solids, is often incidental, and is more purely spasmodic. In Hysterical cases, the
Iron

Iron may be employed with success, while in the Hypochondriac it is hurtful.

Iron has also been employed in Intermittent Fevers. Stahl and his followers, laying it always down as a rule, that a Fever being an effort of nature to throw off from the body some morbid matter, thought they very seldom ought to be stopped; and even in Agues, on this account, they have been very sparing of the Peruvian Bark. They used, however, for this purpose of Intermit-
tents a very subtile Crocus of Iron, obtained in melting Antimony with nitre. We shall afterwards find that this acts in the same manner as other Astringents, and even as Peruvian Bark itself.

Iron, as astringent, is improper in inflammable cases. Some Astringents are employed in Continual Fevers, but Iron ought to be avoided, as encreasing the inflammatory diathesis. This applies to other cases, where Iron is more commonly used, *viz.* in Hæmorrhagies, *e. g.* in the Hæmoptoïsis. This sometimes may depend on a laxity of the solids, but much oftner owes its rise to an encreased impetus of the fluids. This case, if not inflammatory, is very nearly akin to it, and the same crust occurs in the blood as in other inflammatory cases. Iron, then, in these cases, ought to be given with great caution, for Hæmoptoes are often the consequence of Phthisis, or Consumption of the Lungs. Iron, in these cases, by its sudden astringency may stop the flux, but then the inflammatory diathesis is continued, and often a suppuration brought on. Even Alum, &c. are not very proper, and bleeding and the antiphlogistic method is much preferable.

D O S E S of I R O N.

These are uncertain, small doses ought always to be employed, and if a strong astringency is necessary, we ought rather to manage our Iron in giving it frequently at proper intervals, than by encreasing any particular dose.

The

The virtues of *Green Vitriol* will be understood from what has been said of Iron itself.

HÆMATITES.

This is one of the principal Ores of Iron, which may be extracted from it by the several acids, and employed in all cases where Iron is useful; but as it is only Iron which is extracted, and to which the Hæmatites owes its virtues, that substance may be rejected as superfluous.

The same observation applies to the *Rubrica fabrilis*, another Ore of Iron.

L E A D.

This is not used in medicine, except when combined with other bodies. With oil its calces combine and form the common plaster, which is the foundation of most of the rest. To this plaster, Lead gives no other property, but that of consistence. Lead unites with the several acids. For medical use the vegetable is commonly used, and acts on it as well as the others. The preparations with this acid and lead in common use are the *Saccharum Saturni*, *Acetum Litbargytes*, and common *Cerusse*.

Externally Lead is used as an astringent. It diminishes the mobility more than alum, *e. g.* in sore eyes. But let it be observed here, that Lead absolutely destroys the mobility of our fibres. Lead has been used in erysipelas, but in general astringents are often improper in this case, and great caution is to be enjoined in the use of Lead, as it often brings on palsy in our fibres. I myself have seen it produce gangrene in the erysipelas.

In burns it is often employed in the *Unguentum album*; but if long used, it induces flaccidity of the part, and makes the ulcers difficult to heal. Mercury and Lead, combined, have cured scrophulous ulcers, where other means had failed; but a caution
ought

ought to be observed here, *viz.* that if the scrophulous ulcers are very numerous, and the Lead be used too freely, its exhibition may be attended with bad effects.

Internally Lead is a powerful Astringent, and is employed in Hæmorrhages. We must, however, always be aware of its deleterious effects.

Every body knows its bad consequences to the Miners; and the custom which some Vintners had formerly of mixing Lead with their wine, in order to obviate its acidity, which indeed it did powerfully, shewed sufficiently its poisonous effects. In Hæmorrhages, its action is on the nervous power; for it is never given in such quantity as to stop the Hæmorrhage by corrugating the fibres, or coagulating the mass of blood. Its effects being of this kind, have made it to be employed in *Diarrhæas* and *Dysenteries*, in the *Fluor albus* and *Gonorrhæas*. In all these cases its effects are powerful, so that I could wish to be able to inculcate its use. For a few doses, if we have occasion for it, may sometimes be used without bad effects; but if its use is continued for any length of time, its bad consequences will certainly appear.

Saccharum Saturni and *Tinctura antiphtbifica*, into which that certainly enters, have been employed in Continual Fevers, with remarkable success, not having such a stimulus as the copper, and taking off the nervous symptoms, the *Delirium*, *Subsultus tendinum*, &c. as may be seen in the *Acta Naturæ Curiosorum*. I have no manner of doubt of its efficacy in this respect as an Astringent, and consequently an Antispasmodic, but as its effects in any large quantity are so pernicious, in spite of the recommendations of several Germans, we should always use such a remedy with very great caution.

Z I N C.

This is a substance very little known in medicine. Its effects are certainly not merely astringent. Flowers of Zinc have been said by some to have been employed, but not by any Authors of note.

As to *Lapis Calaminaris*, the ore of Zinc, and Tutty, which has been supposed the Flowers of Zinc, the *Cadmia fornacum*, which, however, Neuman raises very great doubts about, they are inert substances; for, boiled in water, they give no impregnation, and with acids have no virtues. In our ointments they have no effect, except as joined with Vitriol and other substances. The *Lapis Calaminaris*, in Turner's Cerate, serves no other purpose but taking off the unctuousity, which in itself is hurtful. But for this purpose any other subtle powder would have the same effect.

White Vitriol is a combination of the Vitriolic Acid and Zinc; but has always along with it some copper, or iron. It is used in sore eyes. As it contains Zinc, we should be very cautious in its internal exhibition. It has been given as a vomit, and said to have a very sudden operation, but I have never been able to observe this, and certainly its use in any considerable quantity must be attended with very bad consequences.

V E G E T A B L E A S T R I N G E N T S.

We now proceed to these; for the Animal Kingdom scarcely furnishes any Astringents, except the Animal Earth, commonly called calcined Hartshorn, be reckoned as such.

With regard to Vegetable Astringents, they are of less sudden operation than those of the Fossile Kingdom.

I imagine Vegetable Astringents, as well as all others, act in the *primæ viæ*; but the stimulus of metallic Astringents, makes their effects

effects much more propagated over the system, than those of the vegetable. Applied to the tongue, Vegetable Astringents give a much weaker impression, and there is no Physician will have recourse to them for stopping Hæmorrhages, upon any exigency. They may indeed exert their powers over the system, but then they do so, only slowly and gradually. Vegetable Astringents, when we want them to be efficacious, must be exhibited in substance. This has been little attended to. The reason for this method of exhibition is, because we have no powerful menstrua for their solution. We have, indeed, water and alcohol, but the former will not dissolve one ounce of any Astringent without repeated affusions and decoctions; and with the latter a very great quantity of the menstruum is requisite; and, after all, in either case, the impregnation is inconsiderable. We do not chuse to use these solutions for another reason, because the means used for solution have an effect upon the medicine; much heat and long boiling actually destroying the astringent quality and vegetable texture. Water, too, although it washes out the astringent quality, when boiling, and seemingly suspends it, yet upon cooling, deposits much of what it had taken up. Upon these accounts, Vegetable Astringents should, if possible, be given in substance.

Another reason not commonly given, why the Vegetable Astringents are weaker than the Fossile, and why they should be always administered in substance, is, that the Vegetable Astringents may have their texture destroyed in our stomach, from the fermentation going on there; whereas the Fossile Astringents are not liable to this effect, and can only be hurt by mixture.

There is a curious observation of the late worthy Dr. Alston, viz. that the Peruvian Bark, operating in the stomach, remains for a long time in the solid form in which it is exhibited, and there is great reason to believe, that all Vegetable Astringents act in the same manner. I myself have seen Peruvian Bark thrown up, unchanged, after having remained in the stomach eight days. Hence

if we throw in this, or other Astringents, in a fluid form, both because they are liable to pass easily off, and because they are thus more subject to the fermentative process, we may often be disappointed in their success. Here also is an additional reason for the sudden operation of the Fossile Astringents, *viz.* because they are more quickly dissolved than the Vegetable. But wherever there is danger from a sudden astringent, and wherever a slow operation is required, the Vegetable Astringents are preferable, and are universally used in all such cases.

Vegetable Astringents are recommended in Hæmorrhoidal Swellings and Bleedings, but it is extremely doubtful, how far their use is proper. Wherever these are the effects of *plethora*, and Nature attempting a discharge, we must be very sparing in the use of Astringents. But this is not always the case; they are often in consequence of a habit induced of costiveness, where the blood, hindered in its passage, is poured out into the cellular membrane, and the *ecchymoses* there kept up on account of laxity; for it is not owing to a varicous distension of the veins, as some have imagined; for inspection proves the contrary. In this case, where the swelling is kept up from laxity, Vegetable Astringents may be of considerable service. But sometimes, although these evacuations are not natural, yet they are habitual, and when suppressed suddenly, may bring on equally bad effects, as if they were critical; so that Fossile Astringents are not to be used here, on account of their being apt to induce a sudden astringent. Vegetable Astringents, then, are preferable, because they operate slowly and gradually on the constitution; but even these, from a long continued use, are liable to bring on a costiveness, which is absolutely inconsistent, with the cure of Hæmorrhoidal Fluxes. In the exhibition, then, of these Astringents, we should always take care to obviate this costiveness they are so apt to produce.

Having said thus much of Vegetable Astringents in general, I now proceed to talk of particulars; where, indeed, properly we shall

shall have little to say upon each. If you look into *Materia Medica* writers, you will find them, under each particular Astringent, telling you, that it is fit for Spitting of blood, *Diarrhæa*, Dysentery, *Fluor albus*, and every other fancied encreased excretion; in order to swell up their volumes. They do not always, however, put all of these under each particular simple; but distribute their diseases to peculiar ones, and say, that this is good in Dysentery, that in *Fluor albus*, &c. All this, however, is not always merely for ostentation; for it sometimes happened that one, accidentally being prescribed in a particular case, was afterwards always used for the same; although the others might have answered equally well. You will not, then, expect that I shall follow these writers in this method of procedure. I shall only mention where a particular Astringent is accompanied with some other peculiar property which modifies its operation.

You will observe here, that I have thrown the substances into distinct *fasciculi*, with blank spaces and letters between. Many of these spaces may be filled up with the name of the natural order of Linnæus.

The first eight at *a* belong to the *Senticosæ* of Linnæus, and is the thirty-fifth order of his *Fragmenta*. This natural order is better established than many of the others. They are all of one common quality, but some of them are not used in medicine. I have only set down such as are to be found in our Dispensatory lists. If in any place of the world these I have mentioned are not to be found, we may safely substitute for them any others of the same natural order. With regard to this order, as all the *genera* agree, so do each of the species in virtue; so that besides the officinal species we may take any one species of any of these *genera*, for the same purpose. Whence we see the extensive use of distributing plants according to their natural order in Botany, if this is made up with sufficient accuracy. It has been common for *Materia Medica* writers to introduce the variety of names, &c. under each particular

cular substance; but I think it is much better to refer you to the late Authors, especially to Linnæus's *Materia Medica*, where you will find his own name, Caspar Bauhine's name, &c. by which means you will be enabled to get the names of other Authors.

These preliminaries thus settled, as to the eight plants, at the head of which is *Agrimonia*, they are all of the same virtues, which are shortly summed up in their Astringency. They may possess different degrees of this, but that difference is not ascertained; in quality they hardly differ. Some of them have annexed to their Astringency some other qualities, *e. g.* *Argentina* root has a sweet with its Astringency; *Fragaria* more Bitterness than any of the others; in *Tormentilla*, *Caryophyllata*, &c. some *aroma*. Except from Sir John Floyer, I have got very little assistance in the sensible qualities; for Lewis has copied him very inaccurately, or, when he has advanced any thing of his own, has done it imperfectly.

With regard to these plants, as they stand in our shops, the first five stand in the Edinburgh, and not in the London Dispensatory. But neither in the former are they inserted from any particular virtue, but only from a timidity of rejecting too many substances; thinking it better, as in some editions of the Dispensatory it is expressed, *copia quam penuria premi*; neither again have the London College expunged them from any noxious quality, but only from their not being used in present practice; which, by the bye, is far from being a test of the inefficacy of medicines. However, it is certainly true, that the three which the London College retain, are certainly the most powerful; for we use only the herbs of the first, whereas the Astringency resides most in Barks.

The London College still retain the Rose, on account of its fragrance; but certainly *Quinquefolium* and *Tormentilla* are the most powerful of the eight set down; whether we trust to experience, or
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their sensible qualities. As to the sensible qualities, in the leaves there is a mucilaginous quality, in the roots the Astringency is more pure and entire. *Quinquefolium* and *Tormentilla* are both remarkable Astringents, and have the same virtue with these. The first has been used by Hippocrates, and since his time in the cure of Intermittent Fevers. Many other common Astringents have been used for the same purpose. The *Quinquefolium* has a Bitterness with its Astringency, which is perhaps necessary in the cure of Intermittents, as the Bark possesses it so much. The Germans use *Tormentilla* for the same purpose, but join it with Gentian and other Bitters, which they say answers equally well with the Bark in the cure of Intermittents. *Tormentilla*, and other Astringents, have also been spoken of for their alexipharmic virtues in pestilential disorders; that is, in putrid continual Fevers. In Germany, *Tormentil*, &c. have been used in the Small-pox; so that hence we may suppose, that other Astringents, besides the Bark, may be useful in Fevers, in bringing on suppuration.

Tormentilla and *Quinquefolium* may be extracted by water or alcohol, but from either, a slight impregnation is procured, and much boiling in water deprives them of somewhat of that astringency.

D O S E.

Materia Medica writers have commonly under dosed these substances. The medical virtues of the roots are almost all lodged in the cortical parts; so that when the roots are so large, that you can throw away the pith, the dose may be in a smaller quantity, than if we employed the entire root. When thus prepared, they may be given in a dose of ʒß. or ʒj. and where a more sudden astringency is wanted, we repeat the dose so often, as to give ʒj. in twenty-four hours, as in the use of the Bark.

The next set mentioned in my Catalogue, are the *Stollatæ* of Linnæus; the forty-fourth number of his *Fragmenta*. It
is

is but a small order, even among the Botanists. The three set down are what are retained in the Edinburgh List. The London College only retain the *Rubia*. They all possess the astringent quality so weakly, that they may be rejected. They are constantly marked by *Materia Medica* writers as Diuretics. We might reject this as imaginary, were it not so constantly repeated, and, indeed, by authors of some credit; so that we should always have this quality in contemplation. To other Astringents the same property has been attributed; but for my part, I am able to give no reason for it. *Rubia* has been lately observed to colour the bones of animals who feed upon it. Long ago it was observed to have the power of colouring the urine, and by some experiments of Dr. Young, it has been also found to colour the milk. This shews that vegetable substances penetrate farther, unchanged, into the system, than has been imagined. It seems to contradict what I was saying, of Vegetables undergoing a change in the *primæ viæ*, and having their peculiar qualities destroyed. Here we see the colouring substance of the *Rubia* carried through the circulation, and deposited in the excretions, but how far this retention of colour implies a retention of virtue, I shall not say. Often the colouring matter resides in a very small quantity, and diffusion of substances often prevents their operation; so that the reuniting of the colouring substance in the excretions is no proof of its being in such quantity in the blood, as to produce any considerable effect. Madder is found to change the health of the animal who takes it, making it dispirited, sluggish, &c. Hence, then, we see it certainly exerts powers over the system, and whatever has the power of even hurting, may be of use in medicine. But with regard to the *Rubia*, as it requires very large quantities, it cannot be used, and its dose is uncertain. *Rubia* has been recommended in the Jaundice, but may safely be rejected, with many other medicines recommended for the same malady; and there is no tribe of Medicines which may more safely be so, than those recommended for this purpose. Now we know that this disease depends so often on stones in the biliary duct,

and

and can only be cured by solution or evacuation, and as very few medicines can produce this effect, we cannot suppose the *Rubia* of any consequence in this disease. The cure of the Jaundice is almost always sudden, from the stone being evacuated, and hence it is that many medicines have been supposed to cure the Jaundice, from their being luckily given when that effect happened. The cure, then, of this disease, must depend on solution, or evacuation. For the former, we have yet no remedies; for the latter, the *Rubia* can have little effect, and it must be attempted by Emollients, &c.

The next order in my Catalogue, is the *Vaginales*, the twenty-seventh order of Linnæus. The first plant of this order mentioned by him (the *Laurus*) is improperly arranged; as it differs from the rest both in habit and virtues; indeed, the whole Plants of this order* do so pretty much; for which reason I have given those of my list officinal names.

With regard to this set of Plants, they differ also in another way, many of them containing an Acid beside their Astringency, and in this set of plants we have the different gradations of acid, austere, and acerb. The Astringency is lodged chiefly in the roots, the more pure Acidity in the leaves. In the roots also there is frequently, more or less of a purgative quality, most remarkably in the *Rheum*, though in some degree also in the *Lapatha*, or Dock kind, so much a-kin to it. There has been a dispute about this purgative quality in the Dock kind. Their Astringency in this country is often so great, as to overpower that effect, but this does not at all refute the truth of that assertion; and I myself have seen Monks Rhubarb, given in sufficient quantity, produce that effect. The *Bistorta* of all these Plants contains the simplest and purest Astringency, and therefore is of most frequent use as an Astringent.

* Some species e. g. of the *Periscaria* (which is but a species of the Bistort) are extremely acrid, while others are more mild

LECTURES ON THE

Astringents are frequently of use in Scurvy. The *Vaginales* are more frequently employed for this purpose, though at the same time there are instances of the others being employed in the same way, which prevent our thinking that this virtue in them is peculiar. In these, however, their Acidity may add to their effect; for that, either separate or conjoined into Acerbity, is found most appropriated to the Scurvy. Here the vague and undetermined notion of the Scurvy has occasioned confusion in the *Materia Medica*. This term has been transferred to many cutaneous diseases, which are of a very different nature, and with whose nature we are not so well acquainted. When I speak of the Scurvy, I always mean the Sea Scurvy.

The Itch has been supposed one of the Scorbatic disorders, and Astringents have been accordingly applied, as the *Oxylapathum* in our *Ung. Antipforicum*; but on repeated trials, I maintain it has no such virtues. In general, Astringents are improper in all those cutaneous eruptions, which are in the least degree critical, or an effort of Nature to throw out the offending cause to the surface.

PHARMACEUTICAL TREATMENT.

All these Astringents may be employed in substance, but they are, too, among those which may most properly be given in solution. Water in decoction extracts their virtues, Spirit has little effect. As to Rhubarb, and its treatment, we shall afterwards talk of it.

F I L I C E S.

These are the sixty-fourth of the *Fragmenta*. Of these, I have only set down what remain now in our Dispensatories; though formerly, many more of the same order were inserted. As to their sensible qualities, I know little of them. Floyer has distinguished a taste, inherent in this order, called the *Ferny taste*; by which he understands more or less of a Sweetness, joined with Astringency. If it be true, as is by some alledged, that this Sweetness is so great,
that

that the roots have been employed in times of scarcity, as food ; we cannot suppose them very efficacious, as medicines. But, though some of these may thus be employed, yet many are too astringent to be nutritive, and many have a sensible acrimony. *Polypody*, one of these, on account of its acrimony, is transferred to the purgatives ; and as this quality is very sensible in one, we should always consider that it may be in the others. It is said, and in some measure vouched, that the roots of some of our plants have been useful in destroying Worms. At first view, this would seem to be owing to their acrimony ; but we know that simple sweets, as wort, *e. g.* have been efficaciously employed for the same purpose. From their Astringency they strengthen the tone of the intestines, so that it is doubtful whether Ferns are an Anthelmintic, from their sweetness, acrimony, or astringency. The Ferns seem to me chiefly to be considered as Astringents, of which, in general, they have had all the virtues ascribed to them ; as curing Rickets, Scurvy, Spasmodic complaints, &c. All these effects are intelligible, and may be explained from their astringency. Some others are ascribed to the *Filices*, or capillary plants, which I cannot understand, *e. g.* their pectoral virtue. Thus the *Adiantum* has been constantly reckoned ; for which we have substituted our native *Trichomanes*. However, although I cannot explain the virtue, to reject what has been so constantly affirmed, would be dangerous. We may with more safety reject their hepatic and splenic virtues. How medicines act on these *viscera*, is at all times very difficult to explain, and a specific virtue is perfectly unintelligible. If the liver or spleen are spasmodically affected, the Ferns, as Antispasmodics, may be useful, but that they can take down the Spleen, or make it disappear altogether, is a mere chimera. Other Astringents have been employed in checking Catarrhs, and indeed there is one case afterwards to be mentioned, where Astringents are the only efficacious medicines. A third effect ascribed to the Ferns, and many other Astringents, is that of acting on the urinary passages as nephritic Diuretics, Lithontriptics, &c. It is enough here to mention this : I shall afterwards talk of it more fully.

LECTURES ON THE MUSCUS, LICHEN KIND.

This is not in our present Dispensatories, but was formerly in all of them. The term is ambiguous. If we take it in the botanical sense, as comprehending all the Mosses, it will not apply; as many of these have a strong acrimony, &c. Here the term *Musculus* stands for the several species of what are called *Lichens*, which are plainly astringent, and recommended in diseases of the breast. I have set it down chiefly for an observation on the Cup-moss, or *Musculus pyxidatus*. I take this from Willis, a man much employed in practice, who, on account of his exploded theories, is, perhaps, too much overlooked. He candidly owns, that the Chin-cough is a disease, in which the Physicians, he says, seldom, the old women often succeed. The Cup-moss, he says, is the chief of the empiric remedies, and I myself have seen it used with success. Other Astringents have also been employed for the same purpose. The Bark has been recommended by Burton, and, on trial, I have found it to answer with success, but it is generally very difficult to make the child swallow the proper quantity; and it would be much easier to exhibit the simple Astringents, where there is no bitterness, as the Cup-moss.

ACIDO AUSTERE, or ACERB.

We have now finished those Astringents which can be ranged in botanical order; I have, therefore, next pursued the analogy of the sensible qualities. The number of the *Acido-austere* might have been much increased, by adding all unripe fruits; but I have confined myself to such as have this quality in their ripe state. If more had been added, we might still have said, that they had all the same virtues, and only differed in degree. The one most easily procured, (which will always be a cause of preference, especially as I imagine it is one of the strongest,) is the *Prunus sylvestris*, or common Sloe. Indigenous plants should always be preferred to exotics, on account of our certainty of their genuineness, which is far from being the case with the other; and, indeed, in most cases, they are of sufficient efficacy;

efficacy ; though from all this I would not have you conclude, that I think the general rule, of Nature's having given to every particular country remedies adapted to all its diseases, to be true. I shall only mention the Sloe, as I think it may serve for all the rest. In the Edinburgh Dispensatory, an Extract is ordered to be made of this ; in the London, a Conserve. As it is a substance that acts more on the *primæ viæ*, than in remote places, its acerbity will, perhaps, make it preferable, in the Dysentery, to the more pure austere. *Diarrhæas*, though *seldom* epidemic ones, may be brought on by eating too much ripe fruits ; to obviate whose effects the acerb will be proper ; but then they must be such as are not liable to a fermentation ; so that when sweetness, the cause of fermentation, is joined, those will be improper, and they should be more acerb than sweet. The preparation, then, of the London College, by adding three parts of sugar, is certainly wrong ; neither is that of Edinburgh without its disadvantages ; for, by long continued coction, the astringency is apt to be destroyed, and, if the extract be dried, towards the end of the process, it is rendered a very difficultly diffusible substance. In my opinion, a medium is best. It ought to be made like elder-rob, boiled to a certain height, and then some sugar added, to keep it diffusible. This method of treatment will apply to other substances.

Next follows in my Catalogue a miscellaneous list, containing substances that have been employed for the same indication, which have no particular analogy, either in botanical characters, or sensible qualities. Astringency is a very universal property in vegetables, and in all the solid parts of these, as I formerly hinted, there is more or less of this quality. The list here might have been very much increased, but I have only inserted those substances that have it in the greatest purity, and little of any counteracting quality.

ANCHUSA, ALKANET.

These belong to the *Asperi folia*. I imagine all these have more or less of an Astringency ; in few, however, it is considerable. From
their

their conjoined mucilaginous quality, they have been transferred to the class of Demulcents*.

BALAUSTINA, BALAUSTINES.

These are the flowers of the Pomgranate. These are very pure and simple Astringents, though not supposed one of the strongest. With regard to its use, it is one of those that give out an elegant tincture, which, in general, is more easily extracted from flowers than from wood; this it yields to water, and scarcely at all to spirit, so that Decoction is the best preparation of it.

BRUNELLA, SELF-HEAL.

This is a very weak Astringent, though recommended by *Materia Medica* writers. Both from its taste, and the class to which it belongs, viz. the *Verticillatæ*, the most of which are acrid and stimulating, &c. we must not expect from them any material Astringent.

HYPERICUM, ST. JOHN'S WORT.

Although, formerly, repeated testimonies have been given in favour of this plant, yet it is scarce at all regarded at present. I think we should not be so audacious as to neglect it, for by the sensible qualities it appears active, which always must be a rule to suspect and enquire into its virtues. To the taste it is astringent, with a bitterness, which is commonly very consonant to an astringent virtue. With these sensible qualities, it manifestly contains a large proportion of a subtile essential oil. Held to the light, it seems full of small holes, and hence is called *Perforatus*. These, however, are only cells, in which the subtile essential oil is lodged. Somewhat of the same kind appears around the sides of the flower. All these are presumptions of its utility, and there are many well-

* This is the most sensibly astringent of all this order.

vouched testimonies of its virtues, particularly of its diuretic powers. This virtue is said to depend on its terebinthinate oil, but it also exerts the same (where much of that oil must be lost) in dry powder, and in decoction, so that its diuretic quality seems to depend on its astringency. I have often intended to make trial of that substance, and if any person has a design of prosecuting the experiment, it is necessary he should learn to extract the subtile essential oil, upon which, perhaps, its active virtues depend. Alcohol does this best. Neuman tells us, that the first affusion of that gave him a pure red tincture, but that a second gave a green, less impregnated one. Hence, then, I would recommend extraction by one affusion of Alcohol, bringing that to proper strength, by applying it to fresh parcels of the plant. As after this combination the Alcohol rises with less heat than the oil, we may obtain our impregnation much stronger by evaporation.

This oil is much recommended in Epileptic and Maniac cases, where, I confess, I do not understand how it can act, though, indeed, there are testimonies of its virtues.

L Y T H R U M.

This was formerly known under the name of *Lyfimachia*, but now it is properly referred to different genera, as *Epilobium*, &c. They are all of the same natural order. *Lythrum* is applied to the genus of *Lyfimachia* by Linnæus.

I insert it here from De Haen's authority, who says it was communicated to him by an Army Physician, and that he, in conjunction with Van Swieten, had experienced its good effects, in ten different cases after Dysentery. After exhibiting a purge, he gave it in doses of a drachm, night and morning, and says, that if the disease be recent, it will cure it in three days; he cured an old Dysentery (*annosa*) in three weeks, which had resisted every other remedy. We seldom employ Astringents in Dysentery. It is commonly

monly said they ought not to be used before the acrimony is evacuated. I explained it in another way, *viz.* that before the determination to the intestines was taken off by other remedies, Astringents ought not to be used. De Haen should have told us the cases and circumstances of Dysentery where *Lytbrum* was proper. He says it ought not to be used where the intestines are full of fordes, and in cases of laxity. By this I understand nothing. If in recent cases he talks of laxity, it is merely from theory. In his fourth part, however, he says, that the *Lytbrum* is chiefly of use in old Dysenteries; and here I think that this and other Astringents are extremely proper, and we are generally too late in their exhibition; strong ones would be improper, but certainly such as will bring on astringency by slow and mild degrees, ought to be used.

M I L L E F O L I U M.

This is much used in Germany, where it is considered not only as an Astringent, but a Sedative and Antispasmodic. It was strongly recommended by Stahl, and those of his school; whose authority, however, I should not much regard, (as they often give high commendations to very insignificant remedies,) had not Hoffman also recommended it. It is a very doubtful plant to appearance. The herb seems to be a weak astringent with acrimony. The flowers are remarkably acrid, and contain a very acrid essential oil. It is doubtful (as the part of the plant employed is not specified) whether it is antispasmodic from its astringency, or essential oil. In this country I have seen the powder of the flowers used with success in flatulent cholics; and from its *aroma*, it probably may be useful in hysteric cases; from all which, however, I must suspect, that it ought to be thrown out of the list of Astringents, and put into that of Antispasmodics.

M Y R T U S, M Y R T L E.

Both the leaves and berries have been used, and by their sensible qualities they are evidently astringent; but they are properly neglected.

lected here, as neither being native, nor of such peculiar virtues, as should make us import them from foreign countries.

P L A N T A G O, P L A N T A N E.

This plant has many virtues imputed to it, but from its sensible qualities, I imagined it of little efficacy, till I was informed by the late Dr. Clerk, that he had seen several Hæmorrhages yield to this, which had resisted seemingly more efficacious medicines. If such effects are to be expected from it, it must be used in large doses, and continued for a length of time. I have seen it used in Hæmorrhages and Hæmoptoes, but without any manifest effects; and any that appear, might probably be owing to the other remedies employed along with it, a low diet, and repeated bleedings. The Leaves and Seeds of this plant are in use. The Seeds are of little use, being a mild farinaceous substance, the Leaves are the principal part, and the Husks have most astringency.

P O L Y G O N A T U M, S O L O M O N S S E A L.

Here is an instance of the necessity of taking notice of the particular part of the plant to be used. The Flowers, Berries, and Leaves of *Polygonatum* are of a very acrid and poisonous nature. The Root is the part only to be used. It is remarkably mucilaginous, with little acrimony, which is of the same nature with that of the flowers, &c. but may be dissipated by boiling. By mistake, the whole of this plant has been spoken of as an Astringent, but it ought to be confined to the Roots. The Root I have often known used with success in Hæmorrhoidal Swellings, and Bleedings. The dose is ʒß. boiled in milk from ℥j. to ℥ß. and continued every night; and in many instances have I seen it remove the pain and swelling. Several other remedies of the astringent kind have been employed with success in Hæmorrhoids. Wherever these evacuations are critical, Astringents are improper, but they are not always so. They are often accidental, from hardened *feces* pressing upon, and causing a fullness of the neighbouring vessels; and here, cer-

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tainly,

tainly, when we obviate the costiveness, the habitual determination to the part should be taken off gradually, by the proper and mild use of Astringents. Some have alledged, that the Hæmorrhoids serve the same purpose in men, and are equally necessary and critical with the *menstrua* of women. But I know that as many, nay many more women are affected with the Hæmorrhoids than men, and at the same time have their *menfes* regular, which shews that it is often a disease, and not always a critical determination. In this disease we should employ only such Astringents as act in the *primæ viæ*, and such are the vegetable; for if we employ those of a stronger kind, as Alum, &c. we shall at the same time be in hazard of having their action extended too far, and of suppressing *menfes*, and necessary evacuations.

S A N I C U L A.

Materia Medica writers constantly consider this as an Astringent, but it belongs to the *Umbellatæ*, a very acrid class, and many of them poisonous; and, therefore, *à priori*, we are not to expect any Astringents from this class. I find it has some of their qualities, and that its astringency is very doubtful; and therefore I reject it as an astringent.

S E D U M.

In the eye of the Botanists this is an ambiguous term. It is the name of a genus comprehending a variety of species, of very different, nay, many of them of opposite qualities. What I mean here, is the *Sedum majus*, or *Sempervivum*. It is a vegetable of moderate astringency, and has been constantly considered as a cooler. As it has no sensible acidity, or saline poignancy, I can see no foundation of its cooling qualities. It has been recommended as a cure for corns. Some, for these, have sought a remedy in acrid substances, but these are very improper. This, merely from its succulency, may be useful; for I know no cure for corns, but such as will obviate the hardness in the neighbouring parts, and, by softening,
dispose

dispose the corn to separation ; and this intention the *Sedum* answers remarkably well, applied as a poultice.

V I S C U S Q U E R N U S, M I S L E T O E.

Much superstition has been mixed with the use of this medicine; so much, that its real qualities have been supposed false. But in this I cannot agree. It has been particularly famous in the cure of Epilepsy. When Epilepsy proceeds from an increased mobility, allowing the spasmodic affection to recur upon slight occasional causes, Astringents are certainly useful, and in this case have I seen the Mistletoe used with success. It has Bitterness joined with its Astringency ; and Sir John Floyer says, that he has seen it in some instances cure Quartans, where the dose was considerable, and continued for a length of time. This remedy gained great reputation in England, where several treatises have been written upon it ; and Cartheuser now gives his testimony in support of its virtues. I make no doubt of the virtues, but not on Cartheuser's authority, because in the cases where he used it, he employed several other remedies at the same time.

As to the choice of the plant, we now know that we need have no regard to the tree on which it grows ; for it is precisely the same as obtained from the Oak, Apple, Hazel, &c. This shows that plants do not differ so much from the juices they take in, as from their different assimilatory organs. The whole of the plant has been employed, but the virtue resides in the Bark, which may be used in the dose of ʒß. or ʒj. and if continued for some time, it will be found an efficacious Astringent, especially where a slight Bitter is at the same time required. It is best employed in substance, for it does not give out its virtues in solution.

U R T I C A, N E T T L E.

The sensible qualities of the Nettle are not equal to the virtues attributed to it. Whatever be in this, the testimonies in its favour

are very strong, and I have them confirmed by experience. The great use of it by some, in diet, shows it is not a medicine of great activity. Its recent juice should be employed, or a strong decoction of a handful of it, *i. e.* the herb, and thus have I seen it have immediately effect, in taking off the swelling of the Piles.

It has been much spoken of for diuretic virtues, as well as other astringent plants. This is very difficult to explain, though it would seem they undoubtedly possess it.

U V A U R S I.

This is a title which has seldom appeared in the *Materia Medica*, and never in any officinal list. *Uva Ursi* is not the proper botanical appellation. From the Practitioners at Vienna, we have accounts of very extraordinary virtues imputed to this plant. If these turn out to be true, it will shew us that very curious virtues may be lodged in unsuspected substances. I cannot say what has led them to make use of it. It has been recommended by some as an Astringent. The Physicians of Montpellier have hinted in general, that it is good in calculous cases. Van Swieten recommended it to De Haen, who tells us, that it has been found a certain cure in all cases of purulency, and also in any ulcers of the urinary passages; secondly, in calculous cases, it enables them to retain their urine, and obviates the strangurious pains. It also changed the appearance of the urine. In some of these cases, where it was bloody, alkaline, and purulent, nay so strongly alkaline as to effervesce with acids, it brought the urine back to its natural appearance, and made it deposit a healthy sediment. In some cases, indeed, he says, it failed, but these were such, that in them the urinary passages were in such morbid state, that it was past the power of Nature to have effected a cure, or even Lithotomy itself to have relieved. Where all the symptoms attending the stone seem to be removed, we are very apt to suspect the stone itself is dissolved, but here there was no such appearance, and the catheter

catheter always found the stone of the same size and roughness as before. The plant was always used in substance. At first, De Haen's dose was ʒß. of it powdered, once a day; but he now tells us, in his last volume, that he uses the same quantity three times a day. He makes no observation on the operation of the medicine, whether it bound the belly, palled the stomach, &c. neither does he mention the remedies which accompanied it. He only says, that opiates in the beginning were given, to ease the pain, and that only injections were thrown in; but that soon both these were superseded as unnecessary. To leave without doubt the efficacy of this remedy, De Haen tells us, that, as it required a length of time, many, when their symptoms were a little alleviated, tired with the disagreeable dose, laid it aside, but that soon the same symptoms recurred, which were again relieved by returning to this remedy, and that this renewal of the symptoms from laying aside of the remedy, and relief of them from reassuming it, happened to the same persons five or six times. Taking all these circumstances together, with the authority of two such remarkable persons, acting under the eye of so many people, I think we can hardly doubt of the facts. From some difficulties in theory, and instances where such like testimonies have failed, some doubts may arise; but certainly these should not prevent our making a trial of the medicine.

De Haen has attempted the rationale of this medicine's action, but after many attempts, has at last given it up, as uncertain. Till we have an opportunity of making the experiment, it is worth while to attempt the rationale. It may be observed, and De Haen assists me in the observation, that in the Annals of Physic there have been many instances where calculi have been carried in the kidneys and bladder without inconvenience. This is difficult to account for. Some may think the smoothness of the stone to have been the reason; but it is found, and I have seen stones as smooth as polished marble, give great uneasiness; while, on the
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other hand, rough ones gave none; and even this would not obviate the inconveniences, from the weight of the stone. Instances have been given of lime-water relieving the symptoms of the stone; while at the same time, the catheter shewed the stone still remained in the bladder. Dr. Whitt thinks the lime-water acts by dissolving the stone into a mucous state, *i. e.* its surface, and so taking off the asperity. These, I imagine, will not answer entirely, and in the *Uva Ursi*, the stones have been found equally rough as before; though the symptoms have been relieved; and besides, if the lime-water acted in the way alledged, the dissolved mucus must be carried away by the urine, and if the lime-water continued to act in the same manner, the whole stone would be dissolved, which, in stones of any considerable largeness, has not been found to be the case. We must, therefore, endeavour to find some other explanation.

The symptoms of the stone do not so much depend on the size or surface of the stone, as on the acrimony of the urine, which constantly accompanies the stone. This is certainly the case in the *Uva Ursi*, it removing the bad state of the urine, with little effect upon the stone, which, except the symptoms of the stone depended on the acrimony of the urine, would be inconceivable. In stones of the kidneys, the consequent strangury has been supposed to proceed from consent of the urinary passages, but much more probably does it arise from acrimony of the urine. Here let me throw in an observation, by the bye. It has been supposed a specious proof of the efficacy of Lime-water, that out of the body it dissolves stones; but in these cases the very alkaline urine must be supposed to do the same. In changing the urine, I imagine the *Uva Ursi* may act in changing the state of the secretory organ, inducing a stricture and strength of the part; so that you see there might be some foundation for the so often repeated nephritic and lithontriptic virtue of Astringents, by *Materia Medica* writers. The last I thought impossible to reside in any vegetable, but now you see there may have been

been a foundation for supposing it, as the symptoms of the stone were relieved. As Lime-water and Caustic Alkali out of the body dissolve stones, so they relieve its symptoms in the same manner. If it comes out that the *Uva Urſi* has the effects alledged, we must certainly then think, that the Lime-water acts more as an Astringent than a Solvent; for there are many objections with regard to the solution.

The *Uva Urſi* is not a native of Great-Britain*, and in the Southern countries is only found on the highest Alps, where the snow continues the whole year; so that we should, if the facts be confirmed, endeavour to find a substitute for it; for if it be imported, it will certainly be adulterated. I imagine some other of the Astringents, formerly mentioned, might answer; but I had rather chuse to proceed on the Botanical analogy, and take a plant of the same genus, and as near a-kin to it in habit as possible. This plant is a species of the *Arbutus* of Linnæus; what is most a-kin to this genus, is the genus of *Vaccinium*. The *Arbutus* is a genus not very consistently made up, and it is still a dispute among Botanists, whether several should not be taken from the *Vaccinium* and put into this. There is in Britain only one species of the *Arbutus*, found in the Isle of Mull, by Floyd, but this is so rare, that we must have recourse to a species of the *Vaccinium*; and certain it is, that there are several plants in the *Arbutus*, which were formerly in the *Vaccinium*. The plant I would chuse as a substitute for the *Uva Urſi* is the *Vitis Idæa semper virens foliis*, &c. It occupies high grounds, and is to be found not unfrequently in the Highlands. I have already got a specimen of it; and shall endeavour to procure more, and make proper experiments. The next list in the Catalogue contains

* It has since been found in great plenty in the Highlands of Scotland, by the late Dr. Millar; so that there is no occasion to have recourse to the substitute here proposed.

The INSPISSATED JUICES.

Mastic and *Hypocistis* are almost now unknown; by the accounts we have of them, and by what I have seen of them, they seem to be simple and pure Astringents, but without any peculiar property which should give them the preference to any Astringents in present practice.

CATECHU, JAPAN EARTH.

The name *Terra Japonica* is very improper, for *Catechu* is a vegetable inspissated juice, and that which is most frequently employed. It is a tolerable powerful Astringent, and I have often experienced its effects in Diarrhœas and Dysenteries. I never used it in *Fluxus albus*, profusion of the *Menses*, &c. so that I do not know whether its effects are propagated over the system. Its virtues are equally extracted by water and spirit, and it has no disagreeable smell or taste; so that the use of it is very proper. Though a substance of no great value, we never get it pure, but adulterated with earths, &c. which may be discovered by elutriation, and more effectually by solution. All this would lead us to endeavour to find for it a substitute of our own growth.

SANGUIS DRACONIS, DRAGONS BLOOD.

This is still employed, but is no Astringent. It is a pure resinous body, insoluble in aqueous *menstrua*, and probably in our *primæ viæ*. It was probably introduced first by its signature, as all red plants were employed to stop hæmorrhages. It may be conveniently employed for forming Alum into pills, being melted with the Alum. For this purpose it should not be powdered, and only enters as a fourth of the whole. Our next list is

The BARKS.

Cortex Granatorum & *Querci* are substances extremely astringent, with very little of any sensible Bitterness. Their Astringency is

is confirmed by their use in tanning, so that I believe them efficacious as any Astringents externally applied. They have the convenience of being soluble in water, but then they afford but a weak impregnation, and long boiling destroys their astringent quality.

C O R T E X F R A X I N I .

This has a Bitterness conjoined with its Astringency, resembling the Peruvian Bark, for which, both it and the *Hippocastaneus*, which ought to have been set down, have been employed as substitutes; and, as I have seen, with success. We have here Sir John Floyer's testimony of their being useful in Fevers, where they acted by promoting sweat.

The seeds of the Ash, too, have been employed in medicine, which have likewise a kind of Bitterness, joined with their Astringency, called by Haller aromatic Acrimony; and may be a medicine of considerable efficacy. Both the Bark and Seed have been recommended as nephritic and lithontriptic. Glauber seems very confident in recommending them; and Dr. Bold adds his testimony to the same virtues. If I have an opportunity, I shall endeavour to make trial of them as a substitute for the *Uva Ursi*.

C O R T E X S I M A R O U B Æ .

This is an instance of the fate of medicines, which, in spite of being recommended with confidence, and testimonies given of their success, often remained without a fair trial. The fault is commonly in calling them specific; so that when they are not found to answer in all cases, they are thought to be useful in none. From its sensible qualities, it is not astringent, and from the French writers, it does not appear to be so. Generally in large doses it vomited and purged, and in small, was without any sensible operation. It has been recommended in Dysenteries, but I refer you to the French writers. Next follow

WOODS.

Of these I have only mentioned one, though several others are common. All of them contain somewhat of Astringency, but have other qualities joined, which render them unfit for this intention.

LIGNUM CAMPECHENSE, LOGWOOD.

Logwood, like other vegetable Astringents, is very difficult of solution. It discovers its astringency, by somewhat of an austere styptic taste, more manifestly by its making an ink. Both from the sensible qualities, and its making but a weak ink, I conceive it to be but a very weak astringent, and also from its being used only in decoction. We endeavour to obviate this by bringing it into an extract, but the process is difficult, and seldom well executed, and the long boiling commonly destroys the astringency, as much as we endeavour to encrease it by concentration. Some, however, think its weakness recommends it; but on repeated trial I have never found it of any efficacy.

GALLÆ, GALLS.

This is an excrescence arising on trees, from the puncture of insects. In practice we confine ourselves to the excrescence of the oak, and commonly get it from foreign countries. However, all the Galls have a styptic quality, and I think the term ought to be made general, and we should employ any excrescence of any tree produced in the same manner. That Galls are a powerful Astringent, appears from their being universally preferred in making of ink, and very much in tanning. Galls are remarkable for giving out their Astringency more copiously in solution than any other vegetable Astringent, and therefore for external use, as in fomentation, &c. I have always used them preferably to any other. They are certainly good Astringents, and nothing but the doubts which I gave in general of the propriety of the use of vegetable Astringents hinder their internal exhibition. They have used them in Inter-
mittent

mittent Fevers, as you may see in the Memoirs of the French Academy; and as they are purely astringent, it gives a doubt whether Peruvian Bark acts from its Astringency, or other qualities.

Having finished particular Astringents, I have set down in my list, terms more or less general, in Italic character, comprehending medicines more or less suited to our intention.

1. A C I D S as A S T R I N G E N T S.

These were formerly mentioned in the *Nutrientia*, at *a*, in my list, and will afterwards be so more particularly in my eleventh head, the *Antalkalina*, at 1, and 2. I shall only just now say somewhat on them as astringent.

That all Acids are Astringents is pretty manifest. Applied to the skin they produce contraction and corrugation. Nothing is more common than for the weakest Acids so much to contract the lips, as to take away their colour, hindering them to receive so much red blood as they received in their natural state. With regard to the Astringency of Acids, it may be a question whether it is naturally connected with particular Acids, or whether it is common to all, and only differs from the different concentration. Thus some have imagined that the vitriolic and perhaps the muriatic Acid are stronger than the nitrous or vegetable. Whatever is in this, to me there is certainly a difference between the fossile and vegetable Acids. The vegetable Acid, in opposition to the fossile, is capable of being changed in the *primæ viæ* by fermentation, and of having its acid nature destroyed before they enter the blood. Again, the fossile Acid stimulates the excretories; and if this effect is to be expected from the vegetable, they must be given proportionably in greater quantity. I shall go farther with this observation, and say, that of the vegetable Acid even a difference is to be made. The native Acid is more liable to undergo changes than the fermented, having both the vinous and acetous fermentations to go through, which are past in the fermented Acid. Hence a question arises, whether the acid

fruits be recommended properly in the Dysentery ? To me, indeed, in such cases, vinegar would seem preferable, unless the native Acid had so much acerbity with it, as to have the power of checking the putrefactive fermentation. Hence I imagine there is some propriety in the practice of the German soldiers in the Dysentery, of taking vinegar and cream. As Astringents in the *primæ viæ*, the fermented Acid may be proper, but wherever we want to have the effect of the Acid extended farther, as in Hæmorrhages, there we should prefer the fossil Acids. These have not only the power of producing contraction, but also diminish the mobility, acting as sedatives. With regard to the use of Astringents in Hæmorrhages, it has been objected to its propriety, as their Astringency may often encrease the impetus of the blood. Now the fossil Acids obviate this objection, for they not only constrict, but also take off the encreased impetus of the blood, both as acting like sedatives, by diminishing their moving power, and on the fluids, as far as they enter into them, by allaying their intestine motion.

2. AUSTERE WINES, as ASTRINGENTS.

These act as acerb, but are liable to the same objections as the native Acid. They have, indeed, gone through the vinous fermentation, but that generally imperfectly, and have still the acetous to undergo. By this means they may be troublesome in the *primæ viæ*, and may there be changed before they enter into the blood. Burnt wines are properly employed as Astringents, because by this means their austerity is encreased, and they are rendered less liable to ferment. Upon the whole, astringent wines are of little efficacy, and austere wines are only to be preferred where a choice of *wine* is necessary. In the choice of wines, often more nicety than judgment is shown ; and the colour, which is often artificial, directs more than the qualities. Red wines, however, are commonly preferable as acid and austere. All the others, except the Moselle and Rhenish, are of a stronger body, more stimulant and heating, with less of the Astringency.

3. BIT-

3. BITTERS as ASTRINGENTS.

Bitterness is often conjoined with Astringency, and it is doubtful whether Bitters themselves are not astringent. When combined together they have been universally considered as Tonics and Roborants. Whether this be owing to their Astringency, or Bitterness, shall be afterwards considered.

4. SEDATIVES as ASTRINGENTS.

These are more indirectly so than any of the former. I told you, that a chief use of Astringents was in checking evacuations. Now this may be done either by the Astringents, as contracting the vessels, or by the Sedatives, as diminishing the impetus of the fluids.

5. BALSAMICS as ASTRINGENTS.

These are enumerated under my fourth class of medicines at *f*. They are set down here, because they are frequently prescribed in preternatural and increased secretions of the urinary passages, in gleets, gonorrhœas, &c. In the *primæ viæ*, however, their effects seem opposite to astringency, and under the head of Stimulants, you will see them considered as laxatives, and, indeed, they often make excellent ones; so that, on the whole, they are improperly considered as Astringents. I allow, indeed, that they will act in stopping a gleet; but that, I imagine, is from exciting an inflammation in the urinary passages, to which they have a natural tendency, and a proof of this may be alledged, that *Cantbarides* are employed in the same intention.

EXSICCANTS as confounded with ASTRINGENTS.

Materia Medica writers commonly class these as Astringents. Every dry powder may be employed for this purpose, but none of them have their effect internally. There is one indication of Exsiccants which occurs in practice, *viz.* in absorbing moisture on the
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the surface of the body, as *e. g.* in cases of disagreeable and troublesome sweats, &c. Astringents here would be dangerously employed, as checking, perhaps, critical evacuation, of which exsiccant powders will take off the disagreeableness, without oppressing the discharge. In Erysipelas, and affection of the *rete mucosum*, these powders do not act as repellents or astringent, but by absorbing an acrid *mucus*, which is often apt to exude and taint the neighbouring parts. Powders of boles and chalks have been employed; but these make a hard crust with the *mucus*, and mealy powders have a better effect, which never should be too fine, and thus oatmeal answers better than flour, as it absorbs the *mucus* better, and is not so apt to harden. These I have frequently seen answer, after spirituous and oily medicines, and *Saccharum saturni*, &c. had been applied, without effect, in allaying and discussing the inflammation. If the meal be fixed in the cloth applied, it answers so much the better, and hence the proper practice of the poor people, in using, as an application, the inside of the meal sack.

Astringents being now finished, we shall next proceed to our third general head, *viz.* Emollients.

EMOLLIENTIA.

These are such medicines as diminish the cohesion of the simple solids, in opposition to Astringents. The operation of Astringents is difficult to explain, and is still doubtful, that of Emollients is hardly so. Whether we consider the simple solids as composed of earth, interspersed with gluten, or take them as a mixt, they may be softened by the interposition of fluid parts, or by thinning the gluten. Possibly the term laxative would be more proper than emollient, but we are obliged to retain the latter, as the former would be apt to be confounded with eccoprotics. Emollients are applied with a double intention, not only to diminish the cohesion, but to soften; and may act, either by dissolving the gluten, or by introducing a larger proportion of fluid parts into the composition of the fibre. Perhaps their action ought not to be entirely confined

to this. Around every solid fibre there is a proportion of cellular membrane; nay, some have supposed, that the whole solids of the body are only condensed cellular membrane. Hence, then, Emollients, without entering into the composition of the solid fibre, may act upon them, and produce relaxation, by more fluids being interposed in the cellular texture.

We can hardly say, that Emollients act upon the moving fibres. They can only do so, in so far as tension and firmness of the simple fibres is connected with the oscillatory power of the *solida viva*. It is not the same with the Emollients as with the Astringents; for these last always extend their action, and have somewhat of a stimulating power. If the Emollients propagate their action, it is only in so far as they alter the equilibrium, *i. e.* in causing an increased flow of fluid to the part relaxed. Hence they have been supposed Derivatives, but they are very seldom used *simply* in this intention. Thus we seldom use plain oil, *e. g.* as a Derivative, but commonly assist our Emollients with warmth, which here acts as a stimulant, and determines a greater flow of humours to the part. The operation of Emollients occurs only externally; for we can have but little conception of internal Emollients: We cannot suppose them given in any quantity, sufficient to be introduced in such proportion, to every solid fibre, as to bring on an universal relaxation. Indeed, by simple water, we may diminish the density of the blood, and bring on laxity, and debility of the system; but that this is purely by applying an Emollient to the simple solids, is hardly conceivable. Emollients may have some effect in the *primæ viæ*, and relax the stomach and intestines; but even there, I am persuaded, their operation is perfectly different from simple relaxation; for the intestines are lined with a mucus, which will hinder their immediate application to the solid fibres. The effect of warm water on the stomach is a very difficult problem. After reflection, I have not thought of any thing more satisfactory than this, *viz.* that Nature has given us an inclination for cold, and an aversion for warm water, which, though a most mild substance,

substance, is often rejected in vomiting, &c. This is all that can be said with regard to the operation of Emollients; we now proceed to

INDICATIONS of EMOLLIENTS.

1. They are indicated in every case of too much dryness of the simple solids. Here they can only be applied externally, where there are fissures, chaps, and indurations of the surface. 2. Emollients are indicated in all cases of rigidity, whether it exist in the simple solids, or in the moving fibres. Where the first are within our reach, the effects of Emollients are evident; with regard to the moving fibres, Emollients may act in so far as they fill the cellular texture with water, oil, or mucilage; thus taking off the tension of the solid fibres, and so diminishing the oscillation of the moving. 3. Independent of a morbid rigidity, Emollients are indicated in cases of inflammation. 4. Emollients are indicated, wherever we want to induce a greater laxity, for the sake of derivation or revulsion. I will not determine here, whether they operate in this case by the heat commonly joined with them, or by their moisture; or whether the relaxation is confined to a particular part, or extended over the system. Certain it is, that tension is necessary to the system, and that this tension depends on the tension of the neighbouring parts, and so of the whole system; and it is to be imputed to this, that relaxants, applied to a particular part, will sometimes induce a relaxation of the whole body.

It is not, however, probable, that they go commonly to this degree. In all these cases, Emollients are externally applied. Internally, by these we cannot conceive any considerable relaxation induced on particular parts, which must only be effected by a general relaxation of the system, which must be very slow and gradual. They may act, indeed, internally, not as Emollients, but as Demulcents, covering acrimony, which, as Emollients, they would only dilute.

PARTS of EMOLLIENTS in which their VIRTUES reside.

Wherever any substances act as Emollients, it is in consequence of the water, oil, or mucilage they contain; which, wherever they occur without acrimony, are emollient; and wherever that virtue takes place, it is in consequence of one or more of these. Water, as penetrating more immediately, is, perhaps, most considerable in producing relaxation; but then it has the disadvantage of being soon dissipated, of taking off with it part of the animal gluten, and of leaving the solids more friable than before. If oil could be as easily introduced, its effects would be much more durable, without the inconveniency of water. The extremities of the apertures of the vessels on the surface are extremely apt to be affected with any thing blocking them up. In warm countries, where *sordes* are very apt to adhere to the skin, warm bath is used to clean them off. At the same time unction is used to obviate the crispature, to which the skin would be liable, to prevent its chapping, &c. Mucilages, composed of oil and water, are of a mixed nature, more approaching to water, perhaps, in its penetration, and certainly in its leaving the part more dry and friable. With regard to the use of oil, it is supposed an improper Emollient, as from its tenacity it may stop perspiration, on which account it has been thought that it ought to be rejected in Surgery. All of this theory seems to be unsound. If such was its property in warm countries, where perspiration is so necessary, it would not be much used. I imagine, that, unless where it is so thick as to dry on the skin, and entangle the dust in the air, and the *sordes* of the skin, it can hardly affect perspiration. Hence, then, the practice of the warm countries should always be taken together, unction and warm bathing. Perspiration flows with some force from the skin, as any one may observe, who will take the trouble to render it visible. This velocity is so great, that it would seem to be capable of overcoming the resistance of any such fluid as oil. Nay, I have supposed that oil may excite perspiration, by relaxing the orifices of the vessels, at least some of its effects seem to say so.

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I cannot account for this phenomenon otherwise, *e. g.* in a *Coryza*, where the inner membrane of the nose is so swelled and tumified, as hardly to allow of breathing, which complaint is so frequent in children, as often to prevent their sucking. I have seen relief given by oil or butter. In the *Angina*, it was formerly the practice to employ a bland oil externally, but camphorated oil, with caustic alkali, are now commonly employed. The common people still use butter, or oil, which gives a considerable relaxation to the internal swelling, by producing a relaxation externally, and promoting the perspiration of the part. It may, indeed, act, in some measure, by changing the equilibrium; but it is very plain that it must, chiefly, in the manner observed.

3. *Sensible qualities which discover Emollients.* A bland, mucilaginous, or oily taste, without acrimony.

4. PHARMACEUTICAL TREATMENT.

Emollients are always extracted by water, in opposition to spirituous *menstrua*, whose effects are opposite to relaxation. In some cases they may be extracted by oil, where an oily matter is to be obtained; but I would alledge, that vegetable matters, which contain much oil, will not give it out to oil, and that it would be much better obtained by expression.

PARTICULAR EMOLLIENTS.

With regard to these, they are ranged under three heads, of Water, Mucilage, and Oil.

1. AQUA, et AQUOSA BLANDA.

With regard to the emollient virtue of these, we have already spoken; and of their other virtues shall speak afterwards. In practice, Water is what they chiefly derive their effect from; we indeed endeavour to impregnate this, but, while the Water is in
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considerable proportion, this impregnation adds or diminishes little from its virtue. We must not, however, neglect to talk of the vegetables which have been employed.

C O L U M N I F E R Æ.

Vide Catal. letter a.

This is a *natural* order, as much so as any, and comprehends a great many *genera* and *species*. I have only set down two of the *genera*, which enter our Dispensatory List, though I make no doubt but all the others might be equally employed, in deficiency of these; for, as far as they are exposed to our examination, they all agree in being bland and mucilaginous. The most powerful we know, are the roots of *Althæa*, which afford a mucilage of very great use as a Demulcent. Externally it may be of some use as an Emollient, but as it is commonly so much diluted with water, the emollient effects of it are chiefly to be imputed to that.

Both for an Emollient and Demulcent, the root should not be employed as recently dug up, nor, at the same time, too much dried. In the one case it is too much diluted with water, in the other the mucilage is not easily extracted, so that an intermediate state, between both these, is to be chosen, which, I imagine, is seldom the case in our shops. *Althæa* root might be prepared in the same manner as Salep, and, in a powder of that kind, it would yield its mucilage much more easily.

The *Malva* has nearly the same qualities, but inferior in degree.

F A R I N O S A.

The chief of these have been enumerated under the *Nutrientia*. I have added here some not so commonly known. With regard to these, they are fit for Emollients, as containing much oil. I mentioned their difference with regard to their oil under the *Nutrientia*. Hence you will see, how the *Farina* of the *Légumina* is an Emollient, preferable to

that of the *Cerealia*. Sometimes these meals are employed in poultices externally. Those made of the *Cerealia* soon dry, while those of the *Legumina* are more oily, and retain their moisture much longer. They have been employed as favourite applications to the eyes. For this purpose bean-meal is better than oat-meal, and that again than wheat-meal, as attracting more moisture, and not being so apt to harden. Thus much said with regard to *Farinosa* in general, I proceed to the particular substances set down in the Catalogue.

SEMEN CANNABIS, HEMP-SEED.

In some countries this is employed as food. It is here doubted whether it ought to be applied externally, as medicine. The plant is very acrid, the seeds, contrary to the opinion of some, farinaceous and mild. A Physician here, fond of refinements, used to employ it as food to his patients, and I have never seen it, in valetudinarians, even in considerable quantity, produce any bad effect. With regard to its use as an Emollient, it is an oily seed, affording its oil by expression; but not in any such quantity as the *Semen Lini*, and therefore may be disregarded.

SEMEN CYDONIORUM, QUINCE SEED.

It approaches the *Cerealia*, and might be used in the same manner, as a food. It affords a mucilage without separation of oil, which is very easily extracted, on the account of its being diffusible in water; which has made me lament our not having it in this country. It is remarkable of Salep, that a small quantity of it thickens much water, but the Quince-seed has this effect more remarkably. Infused in water it does not sit heavy on the stomach. They would not answer imported into this country, as they do not keep long without turning rancid.

SEMEN FÆNUGRÆCI, FÆNUGREEK SEED.

This contains an oily mucilage, conjoined with an acrimony and disagreeable rank odour, which has confined its internal use to the
farriers

farriers practice. It is a firm compact substance, difficultly extracted. It may be good in poultices, but then must be accurately powdered, and if kept in this state, is very apt to be adulterated, as we find in the *Farina Fænugræci* of the farriers. All the foregoing I neglect for the following, viz.

S E M E N L I N I, L I N T S E E D;

which has every advantage of mucilage and oil in its seed, and both externally and internally answers every purpose of the rest. From its large proportion of oil it is disagreeable to some stomachs, and cannot be introduced in sufficient quantity. Hence, in these cases, as a substitute for it, the frequent and proper use of the *Althæa* root.

S E M E N P S Y L L I I, F L E A W O R T.

This is the seed of an acrid plant, which contains some mucilage, with somewhat of the same acrimony; which renders it nauseous and disagreeable. For these reasons, and as a foreign plant, it may very properly be neglected.

So much with regard to the particular *Farinosa* as Emollients. Many more of this class might have been mentioned; but I doubt, whether even those set down are properly employed. In short, any mild plant, with much water, might have been added to the list; but except they contain much oil, or mucilage, they may be neglected as Emollients.

O L E R A C E Æ.

Physicians, sensible of the necessity of oil, or mucilage, for constituting an emollient virtue, have explained the effects of these as Emollients, from a saline nitrous quality. With regard to any saline quality softening our fibres, I take it to be impossible; allowing it were, the neutral, in the small quantity contained in these plants, could not have this effect, and if a large one were used, its stimulus would counteract the intention; and therefore, from any supposed

LECTURES ON THE

supposed nitrous quality, the effects of the *Oleraceæ*, or miscellaneous list, are purely imaginary. One case, given in proof of this manner of action, is a deception, *viz.* their use in emollient clysters, which are commonly mere Emollients, combined with a moderate stimulus, which these naturally afford from the salt they contain.

A T R I P L E X, B E T A, A R R A C H E, B E E T.

These contain no active qualities; so that nothing particular can be said upon them.

B O N U S H E N R I C U S, E N G L I S H M E R C U R Y,

I mention, as an instance of the necessity of acquiring the various synonyma in Botany. The botanical name has been applied equally to this and French Mercury, which is an acrid plant, and is commonly mistaken for the *Bonus Henricus*, which is mild, and kept for it in the shops. Perhaps the mistake has been useful, as it may succeed better in clysters; but as an Emollient, its effects are very wide of the *Bonus Henricus*.

M I S C E L L A N E O U S L I S T.

Vide Catal. letter *d*.

A L S I N E, C H I C K W E E D.

This is a mild, insipid plant, ranked sometimes as Astringent, sometimes as Emollient, but in either intention its virtues are inconsiderable.

B R A N C A U R S I N A.

This is somewhat mucilaginous, but inconsiderably so.

M E L I L O T U S, M E L I L O T.

This commonly stands as an Emollient, but its acrimony prevents this virtue. It belongs to the mild class of the *Legumina*, which are employed as food to domestic animals; but is much more acrid than any of its class. It was formerly introduced into our plaisters, but even here, I have seen bad effects, from its acrimony. Hence, and for its being so apt to be adulterated with *Borago*, it is very properly rejected.

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P A R I E T A R I A, P E L L I T O R Y.

There is no foundation for the emollient quality of the *Parietaria*. If any, it is on the same footing as the *Oleraceæ*, from its having somewhat of a nitrous quality. It has, too, somewhat of Astringency. It may be safely, but ineffectually employed. Any inconsiderable pectoral and diuretic virtue it has, must be owing to other qualities than that of emollient.

S A P O N A R I A, S O P E W O R T.

This has probably entered into the list of Emollients, from the soapy smoothness of its leaves; but its juice has no pretension to such quality, being rather acrid. Hence it has been recommended as aperient and diuretic.

V E R B A S C U M, M U L L E I N.

This, too, seems to have been reckoned emollient, from the softness and smoothness of its leaves. It surprizes me to see it has been called emollient, and demulcent; for it has no sensible mucilage, belongs to the acrid class of the *Luridæ*, and, when chewed, gives no taste at first, but afterwards discovers a considerable latent acrimony. In these heads, you see, I have often been obliged to deal in negative virtues. I however, thought it proper to mark some substances, in order to give you my reasons for rejecting them.

R A D I X L I L I O R. A L B. & C E P Æ C O C T Æ.

Both contain a gluey, mucilaginous matter, with some acrimony, which is dissipated by boiling; so that they are extremely proper ingredients in all emollient poultices.

O L E A P R E S S A B L A N D A.

Vegetable oils, if equally bland, have all the same virtues; so that there is no making a distinction of them as some have done.
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They may sometimes be extracted by decoction; but more commonly by expression.

EMOLLIENTIA EX ANIMALIBUS.

The same may be said of these as of the former. Milk is set down first as containing oil, but it rather belongs to the watery liquors, and I imagine is emollient chiefly from the water it contains. All the others mentioned, are only different forms of mild and bland oils.

They are much of the same consistence; and if equally bland, I cannot imagine they have different virtues, which are the same as those of the vegetable oils; although, sometimes, their consistence may vary their use, and make them keep longer. The Axungia, or fat of the Viper, has been recommended as a peculiar remedy applied to the eyes, but any mild animal, and equally fluid fat, would answer the same purpose.

We have now finished the consideration of the Medicines, which act on the simple Solids. We shall next consider those, which act on the living Fibres. I shall here repeat an observation formerly made, *viz.* that the medicines which act on the simple solids do not deserve all that notice they have commonly had in our systems. The observations indeed on the *Nutrientia* are unavoidable, but those which alter the simple solids occasionally, are of very little importance. I observed the Emollients were almost confined to external application, and even there, did not propagate their effects much beyond the part affected. The Astringents were of more considerable and more extensive operation, but then their effects were not entirely confined to the simple solids, and if they were confined to medicines acting merely on the simple solids, we should make but very inconsiderable and very slow changes. The Medicines, we are now to consider, are of more extensive operation; but as the operation is more extended, so the theories are more doubtful. The laws of the nervous power are little known, and the

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explanation of any operation, depending on it, must be involved in the same obscurity.

S T I M U L A N T I A.

These are such medicines as excite the action of the moving fibres in living animal bodies. On the dead body they have no operation. Whatever excites motion in an animal body, is a Stimulus; Medicines, which have this effect, are called Stimulants : First, with regard to their

M A N N E R of O P E R A T I O N.

Here Stimulants, perhaps, may be considered as of two kinds ; First, Those which are indirect, *i. e.* which act on the organs of sense, by which means a perception is excited in the *Sensorium commune*, which, acting there, determines the nervous power to flow more copiously into the whole, or a particular part of the system; Secondly, Those which are direct, *i. e.* because they are imagined to act directly on the moving fibres. The indirect are the most common and universal ; inasmuch that it has been a question, whether the direct action of Stimulants ever takes place, and whether it is not always in consequence of impressions on the organs of sense. But there is nothing more evident, than that Stimulants may excite motion in the moving fibres themselves, independent of any connection with the *Sensorium commune*. Thus we may separate a single moving fibre from the body, where there cannot be any connection supposed with the *Sensorium commune* ; and yet, while heat remains in it, it is capable of having a motion excited in it by Stimulants. Hence I would alledge, that when the living body is entire, that medicines may act directly on the moving fibres, because, in many instances, no effects on the *Sensorium commune* are previously evident. The metaphysical Physiologists have supposed the absolute necessity of a sentient principle present in every action ; and if, sometimes, there is a want of consciousness, they say that this is destroyed by repetition and habit ; and, indeed, in

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many instances, this seems to be the case. Thus the motions of our eyes are owing to sensations excited by the impressions of light; but custom has so familiarized this, that motions come to be excited without our direction. But surely there is no habit of emetics or purgatives, and these do not produce their effects on the sense till the evacuation is made; and if they are sometimes attended with pain, this is not produced directly by the medicine, but by its effect, the spasmodic contraction.

From these, and other considerations, we must admit of two kinds of Stimulants. With regard to their operation, in both cases the theory is difficult. In cases of sensation, some kind of mechanical impulse is sufficiently evident; but we can hardly suppose, that from this we must deduce its effects. The motions produced, are not to be so accounted for. The effects are not at all proportional to the force of impression, *i. e.* the force of mechanical impulse. Weak impressions often produce strong sensation, and strong impressions oftner extend no farther than the part to which they are applied. I own it is to be wished, and the Physiologists are in the right to endeavour to account for motions, as near as may be, from mechanical operation. Thus it is common to observe, that sharp pointed bodies stimulate, and justly, in some measure, such effect may be attributed to the figure, and motions thus excited may properly enough be said to be produced from mechanical stimulus. However, Stimulants are not alone sharp or pointed bodies. Every thing impressed on the fibres, which stretches them out, whether it be blunt or not, proves a Stimulus, and causes contraction. From this effect of stretching, joined with that of points, have Physiologists laid down a rule, *viz.* that whatever approaches to produce a solution of continuity is a Stimulus. But it is extremely difficult to prove this; and our fibres may be put in motion by such causes as will not act in this manner. However, let us grant this for the present, yet it will have little effect in accounting for *Stimuli*; and it is as difficult as to account for the tremor of the air producing sound, or that of the rays of
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of light our ideas of light. Nay, it is thought by Physiologists, that we might have been so constituted, that what now produces odour might have produced light, *et contra*, &c. Thus you plainly see, we cannot account for such effects from a mechanical operation, and, indeed, impressions on our senses, with regard to the ideas produced, and their effects, are by no means mechanical, or explicable upon any theory we know. Even the changes made on the simple fibres cannot be thus explained. The operation of cold is directly contrary to the solution of continuity, for it acts by condensing or encreasing, and yet this is certainly a Stimulus. In short, we are sensible to every mode of motion, if sensible at all, and to every condition in which the fibres may be in.

Hence the difference Physicians have made between mechanical and chemical Stimuli; the first, where the operation can be explained from the figure; the second, where it depends on the operation of small parts of bodies upon each other, from a peculiar property which we do not know. I mention all this, not for any assistance it will give us in our discussion, but in order to avoid foolish theories. Whatever we see stimulates the body, we call it acrid, or sharp. The former term is very proper, but where we say the operation depends upon figure, we can explain nothing from it; so that the Corpuscularian doctrine is very frivolous. The operation of *Stimuli* requires a chemical theory, with which we are not yet provided; but although we cannot explain the direct operation, yet we have some observations to make concerning it.

1. The operation of *Stimuli* is of two kinds; first, that which is in common, or general to the system, and is liable to affect every fibre; secondly, that which is confined to a particular part of the system only. Impressions, made on our senses, give us a notion of specific *Stimuli*. There are plainly certain parts of the body liable to be affected with particular *Stimuli*, as the eye with the rays of light, &c. The organs of sense are not ascertained. Five principal are supposed, but many more are comprehended under the Touch.

All this leads us into the notion of specific *Stimuli*; but we are often apt to be mistaken, and conceive specifics, where there is only a common and general operation. Thus we are very apt to consider as such, those medicines which are necessarily first applied to, and obliged to act on, a particular organ. Thus every medicine which is swallowed, must first thus necessarily act on the throat and stomach, but is no specific. Thus emetics are substances of considerable acrimony, and ready solution; in consequence of which they stimulate the stomach, and are thrown out before they arrive at the intestines; but we know that, if from difficult solubility they do not act upon the stomach, they will arrive at the intestines, and will also act upon these. We are very ready to imagine here, that there is a specific action. No doubt emetics are more disposed to operate on the fibres of the stomach, and purgatives on those of the intestines; but these effects entirely depend on the quantity and solubility of the medicine, and sensibility of the part; nay, even if any of these get into the blood vessels they will act there likewise.

2. There is another case, in which we may be deceived in the specific action of medicines, *viz.* when they are carried into the blood vessels. Here we are very ready to call such medicine as operates more on one secretion than another, a specific. But here we are apt to be deceived from any circumstances which may determine the operation to particular organs, *viz.* from particular alliances to certain *menstrua*, as, *e. g.* that of saline substances with the watery part of the blood, by which means they go off by the kidneys, and thus prove a *Stimulus* to them, without acting specifically: For these very substances may also, by other means, be determined to other secretions. Thus, if the pores of the skin are shut, these medicines will go off by the kidneys; but if by any means, as lying in bed, they are rendered open, these medicines will be determined to that more general excretory, the skin: And it is a common observation, that the same medicine may be indifferently diuretic, diaphoretic, or pectoral; the last in so far as they promote the secretion of mucus in the lungs, the reason of which effect, however, is not so easy to explain.

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3. Medicines have been supposed to have a specific virtue, on a supposition that they have a peculiar power of altering the texture of our blood, inspissating or attenuating it, *viz.* by preparing a great quantity of matter for particular operations. Thus the operation of Mercury has been supposed to be specific with regard to the salivary glands. Others, however, suppose that proceeds from the Mercury being more particularly associated to such parts of the blood as pass by the salivary glands, and that hence it exerts its *Stimulus* more particularly there; which otherwise it does in common to the whole system. These are the arguments which are brought against specific *Stimuli*. If medicines, applied to the external part of the body, be absorbed, and then act always on a particular part, such may be supposed specific. Again, if in injecting substances into the blood vessels, such medicines are always seen to exert their effects on particular parts, as, *e. g.* if jalap always purges, and ipecacuanha vomits, such may be reckoned specific, for such medicines must be poured out promiscuously on all the glands at once, and should therefore stimulate them all alike. At the same time, there are still difficulties to obviate the various causes, which may determine the operation to peculiar parts. There are who, not considering these difficulties, have been very fond of specific *Stimuli*. Some thus have supposed different effects of different medicines acting on the nervous power, and affecting the *Sensorium commune*. Some they have supposed acting on the organs of voluntary motions, others more particularly on the heart and blood vessels. Hence has arisen the distinction between Cardiac and Cephalic. But I know no instance where such effects take place.

4. Another difference of Stimulants has been made from the degree of force. Linnæus's definition of Stimulants is, *Stimulantia secretionem incitant*. This certainly very often they do, by acting on the excretory organ. Formerly, when I talked of my division of medicines, which acted on the fluids, into the *Alterantia* and *Evacuantia*, I observed that in these the medicines act on the moving fibres, and only from their more direct application to the fibres of a particular

particular organ, excited that evacuation. Here let me add, that, taking any particular part of the body, to which a Stimulant is applied, if excretory orifices be the part, their secretion will be produced; if not, the action of the *Stimulus* will extend to the moving fibres of the secretory organ, and cause a greater flow of blood to the part, and prove *rubifaciens*, which is the first appearance of inflammation; and, if the *Stimulus* be strong, inflammation itself; and if in a certain degree of inflammation the *rete mucosum* be affected, raise blisters, and perhaps gangrene. This last has given occasion to a particular term applied, *Epispastica*, in Latin *Attrahentia*.

Abstracting from effects upon the fluids, we now go back to consider the effects of Stimulants on the moving fibres themselves. These have been distinguished into two kinds. Two sorts of motions our moving fibres are liable to, Contraction and Relaxation. A Stimulus, as producing either a single contraction, or alternate oscillations, is said to produce tonic or clonic motions. How far this distinction is of much use, or well understood, I am doubtful. I can easily see the action of the moving fibres depending on the tension of the simple fibres, and the influx of the nervous power* taken together. I can conceive a medicine producing an influx of the nervous power, and causing alternate contractions; but where the fibres, as is said of tonic motions, are still in a condition to perform their functions, that there a single contraction is produced, is impossible for me to imagine. For my part, I have no notion of a simple contraction, but what is durable, and cannot conceive, that by this means a tone can be given to the parts. What I would understand by giving tone to the moving fibres is, (the tension of the simple fibres being given,) causing a greater influx of the nervous power into the parts without contraction. Wherever a simple contraction is produced, it is the effect of a stronger degree of *Stimulus*, causing in the organs of voluntary motion an involuntary contraction, in the involuntary

* The first procurable by Astringents, the second by moderate *Stimulus*.

organs a firm, fixed, and durable contraction, or what is called Spasm. If then we distinguish properly, we shall find that simple and alternate contraction, differ only in degree, and are not opposite ; the first, or spasmodic affection, produced by the strongest degree of Stimulus; the last, or what might be called the clonic, by a weaker degree of *Stimulus*, causing alternate contraction and relaxation.

E F F E C T S of S T I M U L A N T S.

Stimulants extend their effects to parts very distant from those to which they are applied; in most of them to some distance, in others to the whole system. In different *Stimuli*, their effects differ in degree and kind. Some are disposed to affect distant parts, but those very slightly. Thus a pimple on the haunch affects, as has been observed, the opposite shoulder; and I myself, if a dog with his tongue a little rough licks my hand, feel an uneasy tickling in the soles of my feet. The difference in the effects of *Stimuli* in the parts to which they are applied seems to depend on arbitrary laws of the animal œconomy. Thus sneezing is produced from tickling the nose, coughing from any part of the *trachœa*, &c. People here may talk of consent of nerves, but this will not answer to explain the effect. From these instances, we can only observe, that the effects of *Stimuli* may be strangely diversified. I entered upon all this, chiefly for this observation, that many, and perhaps most medicines act on the stomach, and, in consequence of their *Stimulus* there, propagate their effects over the system. It is no objection to this, that we are not able to explain the method of their action, on these distant parts. The action of Stimulants are very much regulated by habit and custom; in so far as they act on the organs of sense, repetition diminishes the force of the impression; so that to produce the same effect after a short time, a greater impression is necessary, and an increased dose to produce the same effect. A difference here occurs in practice, which we do not know very well to distinguish in theory. There is a difference in the action of *Stimuli* in producing motion or sensation. Wherever *motions* are excited.

excited by *Stimuli*, repetition renders them more easily so, and upon slighter causes; but *Sensations* again upon repetition, are rendered more slight. In other words, custom increases the facility of *active* motions, and diminishes that of *passive*. From what I have said of the effect of *Stimuli* producing different motions, they may easily be conceived of great number, and considerable variety; of greater than I can here enumerate. I have in my list neglected the Evacuants, and only set down such Stimulants as produce general motions without regard to particular Evacuations.

INDICATIONS of STIMULANTS.

They are indicated in all cases of languid motion, *i. e.* not merely in weakness; but in all cases where the motion of the system is inert, weak, and slow.

1. EFFECTS in the SYSTEM of BLOOD-VESSELS.

1. They are indicated, where the motion of the blood is suddenly stopped, as in fainting, &c. 2. Where the degree of languor is neither so sudden, nor so inconsiderable, but more permanent in its kind, *e. g.* in the Chlorosis, a disease often arising from affections of the *uterus*; but may also sometimes from other causes. Analagous to this is the Cachexy, a complicated term, where in consequence of various obstructions of the *viscera*, a languor and *inertia* is endued in the system. Stimulants here are especially of use, where that *inertia* is manifestly so great, as to be attended with stagnation of the fluids in particular parts; as in Cachexy with Dropsy; or, as *Materia Medica* writers observe, in Phlegmatic habits. 3. Here, and in the following case, the *inertia* of the blood-vessels is of a more subtle kind. Stimulants are indicated in Gangrene, which is the effect often of motion and inflammation; but in particular cases comes on from an Oedematous Swelling, Hydropic and Cachectic state of the body; and in these cases are Stimulants necessary. In some cases, even where Gangrene proceeds from Inflammation; *i. e.* when afterwards an *inertia* succeeds, are
Stimulants

Stimulants found useful. 4. They are indicated in Intermittent Fevers, where the returning fit is often obviated by their use. I shall not here enter into the theory of Fevers, nor consider whether the *inertia liquidi nervosi* be that cause. It is enough to say, that the attack of the paroxysm is always attended with *inertia*, where it is easy to see how Stimulants will act. They are also recommended in cases of Continued Fevers, but here their use is more uncertain than in Intermittent. Our theory of Fevers renders it difficult to know, when we ought to commence the stimulant, or lay aside the antiphlogistic method.

2. EFFECTS on the NERVOUS SYSTEM.

There are cases where the *inertia* is confined to this. 1. Palsy certainly consists in a weaker flow, or interruption of the nervous power into the part affected. The nature of the obstructing cause there, is not explained. Possibly the nature of the Palsy may be such as to be hurt by *Stimuli*; but certainly there are cases, in which it may be cured by them. 2. Connected with this are other diseases of the brain, Vertigo, Apoplexy, Lethargy, &c. all which consist in a weaker flow through the *Sensorium commune*. Apoplexy is generally distinguished into sanguineous and serous. The application of Stimulants have been confined to the latter. There may be some foundation for this distinction, and there may be cases where there is an obstruction only in the serous vessels. However, I do not know if this should always make a distinction in the application of *Stimuli*. It is commonly thought the sanguineous Apoplexy only returns three times; but I have known cases where it has returned oftner, and have seen an approaching paroxysm, indicated by stammering, &c. obviated by Stimulants, as a little mustard, &c. and even the paroxysm itself relieved by them. If, in consequence of repeated attacks, those patients to whom I gave Stimulants in such cases, happened to die, on dissection there was found all the appearance of sanguineous Apoplexy, distension of the veins of the brain, and extravasated blood. 3. Some species of Head-ach have been cured by Stimulants, *viz.* such as are attended with pale-

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ness, coldness, and languor of the whole body. We cannot here determine the particular part affected; sometimes it appears to be external, and æther, or blisters, have given relief; sometimes, too, it appears to be internal, and an affection of the brain.

EFFECTS in the ALIMENTARY CANAL.

Here those symptoms we call nervous, as often appear as any where else. These are attended with paleness, &c. Sometimes they are observed to arise in consequence of a bad Chylification and Acidity, manifestly depending on *inertia*, and languid action, which are relieved by Stimulants. Sometimes they appear in the whole track of the alimentary Canal, from a slow motion, occasioning habitual costiveness, in which case, too, Stimulants and Aromatics are found frequently of use. I had occasion to observe, that weakness often causes spasms, which frequently occur in *inertia* of the alimentary Canal, and may be taken off by Stimulants, promoting stronger action. When we come to Antispasmodics, we shall explain what concerns this head. These symptoms, acidity, flatulency, &c. appear in hysteric and hypochondriac cases, and therefore Stimulants here are frequently indicated. There is another species of languor when Stimulants are indicated, *viz.* the Gout. The nature of this disease is still involved in much obscurity. Whatever disposition it has to appear in different parts, it is certainly connected peculiarly with the stomach. It manifestly seems true, that, to produce the Gout in the extremities, (its proper form,) a strength and tone of the stomach, and *primæ viæ*, is necessary; for whatever weakens the force with which the Gout is sent to the extremities, must make it return upon the stomach.

The difficulty of the application of Stimulants, in these cases, shall afterwards be noticed, when we come to particulars.

CONTRA

CONTRA INDICATIONS of STIMULANTS in the SANGUIFEROUS SYSTEM.

1. As in cases of languid motion Stimulants were indicated, so in cases of increased motion these are improper. There is no doubt of this, where Hæmorrhage, Inflammation, &c. depend on an increased *impetus* of the fluids, and in every *diathesis* where there is a tendency to these. In the case of Fever, this contra-indication is more complex. Wherever the Fever is in an inflammatory state, Stimulants are hurtful.

Wherever Fever is accompanied with languor and weakness, Stimulants are useful; but we are not to exhibit them in all cases where the pulse sinks, for that is often attended with inflammation; but where the disease manifestly appears without inflammation, and where its long continuance has weakened the patient, then Stimulants may be useful. In general, Stimulants are improper in the beginning of Fevers, and, in the end, allowable.

2. Stimulants are forbid in all Obstructions, which, though attended with *inertia*, yet from the nature, duration, and degree of the Obstruction, we know that it is not to be overcome by suddenly increasing the *impetus* of the blood, but that, by this means, we are in danger of fixing it more, or even of destroying the structure of the part. If Stimulants, here, be slowly thrown in, they, however, may be useful; but here the most necessary means are, relaxing the spasms, and dissolving the fluids.

3. Stimulants, wherever the solids are over-stretched, or wherever, from other causes, they are rendered tender and friable, *rupturæ proxima*, as it is called, are contra-indicated. This they are in all cases where the fluids are remarkably thin and acrid. Here I have in view two cases, Cachexy and Scurvy. By the former, if Physicians mean any thing at all, they generally mean obstructions in the lower belly, where, in many cases, Stimulants would rather have

the effect of fixing the Obstruction, and destroying the part, from tearing the solids already over-stretched, and rendered friable by acrimony. This gives a caution to what we said of the use of Stimulants formerly in Cachexy. In the Scurvy, where the fluids are so acrid as to have eroded the vessels, being poured out, and have caused Obstructions, Stimulants are entirely hurtful. We do, indeed, sometimes use Stimulants in this disease, but they are of such nature as only to promote some excretions, without producing motions, and extending their effects over the whole of the system. In general, I may observe, that I do not extend what I have said on the subject of the contra-indication of Stimulants, to their effects on the secretions.

REMARKS with regard to the USE of STIMULANTS.

The frequent use of Stimulants destroys the tone of the moving fibres, and diminishes the mobility of the nervous fluid. Whatever may be in this last effect, there is one observation which serves to confirm the first; Nature seems to have adapted our organs to the relish of the mild and bland, for such are the substances we employ in food, and universally has she given us an aversion to the poignant and stimulant. With regard to the mild and bland, with them no person is naturally palled, but there are always instances, through the whole of life, of persons entertaining an aversion for the stimulant. Medicines are distinguished as active, acrid substances, and an aversion to such is universally established, and therefore Stimulants are suited to the body as medicines, but, in the main, they are hurtful to the system, and tend to destroy its tone. Hence, then, we should avoid Stimulants as much as possible, since, to produce their first effect, they always require a stronger and stronger dose; so that, at last, so much is necessary as will destroy the tone of the stomach, and that of the whole system. In the first part of life, Nature has wisely given us most aversion to these, as then they would be most hurtful, and, before the natural duration of life was at an end, would require to be given in such quantity as would totally destroy us; in the latter part of life we come to relish them
more,

more, as then the time we have to live is shorter, and, consequently, the danger less.

As to their use, therefore, in general, we ought, wherever they are necessary, to begin with small doses ; so that if a long continuance of them is necessary, we may increase the dose without danger. Whatever disease requires Stimulants, we at first reap good effects from them, but afterwards, from habit, these effects are destroyed. Hence, then, when we can, we ought frequently to interrupt their exhibition, in order to interrupt the habit by which their effects are lost. Nothing is more common than Physicians prescribing a medicine for years, &c. but certainly it would be much better to order an intermission, and perhaps by this means we should attain our effect better at the last, and besides could frequently recur to the same course with advantage.

There is, however, one exception to this rule of beginning with small doses, and that is, wherever a sudden effect is to be produced. This I have frequently seen in the use of Opiates ; where considerable effects might have been certainly obtained by a full dose at first, which could not be attained by small ones frequently repeated and increased. This exception most generally takes place with regard to Stimulants, which act as antispasmodic.

The principal purposes of Stimulants have been now marked out, but these effects are seldom obtained by the Stimulants, we are to talk of. Debility is much better remedied by cold air, cold bath, exercise, diet, &c. These, indeed, might be called *Stimuli*, but surely there is a great difference between these, and the stimulant medicines we are to talk of ; so that unless very immediate effects are wanted, these must be laid aside ; for by the means just now mentioned, we shall obtain the same effects, much more durably, and with much less hurt to the system. Hence the use of Stimulants has declined of late, and does so daily, and many are marked in our Catalogue, which are disregarded in practice, and known only in our Dispensatory lists.

F O U N-

FOUNDATION of STIMULANT VIRTUE in SENSIBLE QUALITIES.

In general, a Stimulant virtue is discovered by a strong taste, and odour; and all substances, which make a strong impression on our senses, may be considered as such. It is difficult to distinguish them all here; as some of these may be sedative, and some antispasmodic; but even these have always more or less of a stimulant virtue. From fragrancy of odour, or even strong poignancy, we are not immediately to infer a stimulant quality. Fragrancy of odour often depends on the volatility of a small part of the whole; Poignancy on the *extreme* volatility of the part, which may be in so inconsiderable quantity, as to be a medicine of little virtue, though at the same time so volatile, as in this manner to affect our smell. From an acrid taste more is to be inferred. However, here we must be aware, that from the operation on the tongue, we cannot always judge of what it will be in the stomach. Some medicines which are not acrid, will seem sedative to the tongue, and within the stomach prove stimulant; and again, some are stimulant to the tongue, which prove sedative in the stomach. Different Stimulants have different qualities, which possibly might be discerned by a difference of acrid taste. This we refer to particulars, as we are not in a state to give any general rules with regard to it.

We shall next enquire into

What PART the STIMULANT VIRTUE is lodged.

Very universally in the essential oil of plants. The saline part of plants is not remarkably stimulant. Wherever, therefore, we have means of discovering essential oil, we also in some measure have the power of judging of a stimulant virtue. Here we are apt to be deceived. We must not imagine, that because a plant gives out an essential oil by distillation, that these plants are stimulant; for many such are of a very mild nature. Again, substances acrid to the
taste

taste give out a mild oil; as that of Cloves, hence the acrimony would seem not always to reside in the essential oil. It is said to be lodged in a resin, which I contend is the same thing; as the medical virtue of these depends on an essential oil. Acrimony often seems to be lodged in a gummy matter, soluble in water. The acrid part is said to be extremely volatile, and not to be obtained in the form of essential oil; as in the *Siliquosæ*, Mustard, and others of the Cress kind; in which it is supposed the acrimony is not lodged in the essential oil, but in a subtile volatile part diffusible, in water. But I find that, on proper examination, an essential oil may be obtained from these, containing all their acrimony; and I am inclined to believe their acrimony is lodged in an essential oil; though that be extremely volatile, and in some measure mixed with water. Because the acrid part is sometimes fixed, some think it is not in the essential oil. This is not conclusive, as some oils are fixed, not rising with water or boiling alcohol; *e. g.* Cloves, a very acrid substance, gives over a very mild oil, even with alcohol, and leaves in the distilling vessel an acrid extract, of considerable virtue, and too much neglected in the practice of Physic, which probably has its virtue depending on an essential oil; tho' some think it resides in a gummy matter.

P H A R M A C E U T I C A L T R E A T M E N T.

Most properly, and very universally, are our acrid Stimulants to be extracted by alcohol. In some it may be extracted by water, but there is a suspicion, that the same impregnation is not to be obtained as by alcohol. We should first digest with the alcohol, and then concentrate our impregnation, by distilling off part of the alcohol. By this means, much purer and finer oils are to be obtained than any in the shops. Dr. Boerhaave directs this method for Saffron; but it may be applied to many other plants.

There is a very common preparation in the shops, *viz.* an impregnation of essential oil with water, in what is called distilled waters. This impregnation with water is not always obtained, and the oil

is often so fixed as not to rise. Altho' the stimulant power may reside in the particular part of the plant, yet we often find the substance of such texture, that we cannot procure its essential oil, without giving more acrimony than before; which, tho' not a formal empyreuma, is often so great, as to render the medicine unfit for internal use. All this would lead us to use our Stimulants in substance, since we find there is in the plant a virtue not to be procured by any extract, and, in many cases, we can make a better solution in our stomach than any where else. With regard to using the Stimulants in substance, we must be aware of the method of preparing them; for, in drying and powdering, the volatile part, and, with it, the virtues are often lost; so that, indeed, it seems to be a doubt whether Stimulants should be exhibited in this manner. If the oil is of a fixed nature, there may be cases where this method is preferable, and some Stimulants I have often seen answer in this manner better than any other way.

PARTICULAR STIMULANTS.

After having said that every substance, which had smell or taste, might be reckoned a Stimulant; you will easily see they must be of great variety. Perhaps we have already delivered their virtues, but there is a greater variety and difference in quality, than is commonly imagined. Many Evacuants and Antispasmodics have been introduced under this title by *Materia Medica* writers.

In my list, I have followed, in arranging my plants, the botanical analogy, and then that of the sensible qualities. At first, I had set down a list of fossile Stimulants, but I now find that these will better come under the heads of Antispasmodics, or Evacuants. Opposite to *a* is placed the term

VERTICILLATÆ.

This is a very natural order, well known among the Botanists, and a very complete one; easily known, as they agree in many common marks. Their virtues are very much in common, and might be

be given in very few words; but that *Materia Medica* writers have distinguished, and, as usual, distributed their virtues. To this I have had a view in the blank spaces left between some of this list, intending in one to comprehend the Cephalic, &c. In general, all are antispasmodic, and may be useful in *frigidis cerebri morbis*. All may be antispasmodic in affections of the breast, may stimulate the stomach, and be antispasmodic there, may stimulate the system in general, and be alexipharmic. Some, however, are peculiarly adapted to each of these heads, and distributed accordingly, according to the method of *Materia Medica* writers; my first set are the

C E P H A L I C V E R T I C I L L A T Æ.

These are, in general, grateful to the nerves, exciting the nervous power, and adapted to all cold diseases of the head, Lethargy, Apoplexy, Palsy, &c. Weakness of Sight, Giddiness, and Weakness of Memory, and many other diseases. All this I give you as an instance of the method in which *Materia Medica* writers lavish out their virtues. In general, they are ranged in alphabetical order, except where two corresponding species are put together.

B E T O N I C A, B E T O N Y.

Materia Medica writers, in spite of the want of sensible qualities, or testimony of Physicians, have been lavish of their virtues. Geoffroy gives us a catalogue, about a page long, merely on the virtues of Betony. After all, very little virtue is found in it. It is a mild Sternutatory, and, as such, will be mentioned in the class of Errhines. It has been said to be hypnotic and anodyne, by Pauli; and, by better authority, Bartholine. Not any such virtue appears in the bark, or leaves. The root is an acrid, emetic substance, and perhaps may contain virtues of some consequence. The *Veronica* is joined by Cartheuser in the same section with Betony, though of a different natural order, and sensible qualities. Perhaps he was led into this by confusion of names, as the Betony has been called *Ve-*

K k

tonica

tonica. This confusion of names has, perhaps, also occasioned a confusion of virtues.

MELISSA, BALM.

Many virtues have been attributed to this. In sensible qualities it is the weakest of its class. It gives a weak distilled water, and a weak solution.

LAVENDULA, MAJORANA, MARUM VULG. ROSMARINUS; LAVENDER, MARJORAM, MASTIC, ROSEMARY.

All these yield a large proportion of essential oil, and are of a fragrant odour, whence their ascribed cephalic virtue. In any quantity in which we employ them, or any impregnation which we obtain from them, their virtues are not remarkable. Wherever the virtue depends on essential oil, it may prove inflammatory, and hurt the stomach.

STOECHAS ARABICA, DICTAMNUS CRETICUS, FRENCH LAVENDER, DITTANY of CRETE.

As the growth of warm countries, these contain more acrid essential oil, and more powerful virtues. They cannot be brought into this part of the world without losing much of these qualities, so that they are properly neglected in our shops.

CALAMINTHA, CALAMINT;

A species of Melissa, which should, perhaps, have been placed among the stomachics. It is a weak, insignificant plant.

PECTORAL VERTICILLATÆ.

HYSSOPUS, HEDERA-TERRESTRIS, PULEGIUM. HYSSOP, GROUND-IVY, PENNY-ROYAL.

Various have been the acceptations of the term Pectoral. I mean by it, such as have the power of promoting the secretion of *mucus* in

in the *bronchiæ*. In innumerable instances I have been able to observe no pectoral virtues in these, they giving no relief in pectoral cases by promoting the expectoration. Ground Ivy has been much talked of. Some tell us it will alone cure diseases of the breast, and, what to me seems impossible but by the Surgeon's instrument, an Empyema. I can find no foundation for those properties. Hyssop is a medicine of more virtue, but properly now neglected, as of the same class of the more active *Pulegium*. Hyssop * is said to prove effectual to dizziness, when softened in warm water. In Ecchymoses, Riolan goes so far as to say, it sucks the blood out of the part, which was seen on the cloth. You see how difficult it is to trust *Materia Medica* writers. I have tried Hyssop in such cases, and found no other effect than from the application of any other aromatic. *Pulegium* is a powerful Antispasmodic, but has little pectoral virtue. It is said to have been useful in the Chin-cough, which is a disease purely spasmodic, where, from its antispasmodic virtue, it may be of advantage. Some women have their *menfes* with difficulty, which have spasms, &c. excited in their stomach, where I have found Penny-royal tea to be of real service. Hence I have placed it next to, and perhaps it should stand in, the next division.

S T O M A C H I C V E R T I C I L L A T Æ.

MENTHA SATIVA & NEPETA, COMMON and CATMINT, are considered as Stomachics, but are weak.

MENTHA PIPERITIS, PEPPER MINT.

This is a chief Aromatic and Stimulant, and one of the few substances for which we have been obliged to the attention of the Botanists. It is one of the most subtle and penetrating of its class.

* In one of the original copies no mention is made of its virtue in dizziness, which word, I apprehend, was mistaken for *discufs*. The whole sentence stands thus :
 " Hyssop, when softened with warm water, is said effectually to discufs Ecchymoses.
 " Riolan goes so far, &c."

Its action is quick and vivid, and as quickly diffused over the system as any I know. There is a difference in the action of *Stimuli*; some act on the part to which they are immediately applied; some, like the Pepper-mint, do not affect that part so peculiarly, but in a more equal manner extend their action over the system. Those which act chiefly on the part to which they are first applied, are apt to excite inflammation. The *Mentha piperitis*, as not having this inconvenience, is a valuable medicine. Its virtues are, to be antispasmodic in the stomach, and, in some measure, over the system.

The Spear-mint, and other species, have all the same qualities, only in less degree; are less extensive in their action, and more apt to produce inflammation. The *Pulegium*, in a dry soil, comes nearest to the Pepper-mint. *Nepeta* approaches to the Mint in appearance and virtues. All, you see, are antispasmodic, whence you understand their stomachic quality. I can see no foundation for the Astringency ascribed to Mint, much less for its anti-venereal qualities, it being, as possessing such, supposed to restrain the seminal secretion, and its irregular excretion in nocturnal pollutions. As such cases occur, at least to me, in lax, moveable systems, I have found Antispasmodics, especially Camphire, useful; and, possibly, Pepper-mint, if it could be rendered as durable in its operation, might have much the same effect. Here is an instance of the weakness of *Materia Medica* writers, in collecting the virtues of plants. Simon Pauli says, that if a vein of the foot be cut, and the part immersed in decoction of Mint, no blood will flow from the orifice. Nobody can doubt but that the vein was improperly opened. This shews the frail foundation on which stand many of the virtues of the *Materia Medica*.

MARUM SYRIAC. SATUREIA, SERPILLUM, THYMUS.
SYRIAN MASTIC, SAVORY, MOTHER of THYME, THYME.

These four are not peculiarly adapted to any particular part of the body. These are the most acrid and considerable Stimulants of the class,

class, good Antispasmodics in the stomach, but more liable to produce inflammation. The two first are the most penetrating of them. The Serpillum is the warmest our climate affords. In slight infusion, as tea, it is grateful to the stomach. This shewed me the difference of Indian teas from warm water, which, of itself, has relaxing effects, which may be obviated by this, and other such Aromatics. Serpillum affords an agreeable distilled water, which should be in common use; it is more durable, but less active and penetrating than Pepper-mint. The Thyme is less aromatic, and contains less essential oil, with more bitterness, and more manifest astringency. Its use in medicine is not ascertained. It is commonly mentioned as alexipharmic, but on what grounds is dubious.

SALVIA, CHAMÆDRIS, SCORDIUM.
SAGE, GERMANDER, WATER GERMANDER.

These are commonly said to be alexipharmic, the meaning of which is not clear. That they are useful in promoting sweat, may be in common with them, and others of the class, when given with much warm water. That they expel the morbid matter of contagion, or of fevers, I will not allow, as I do not understand it. Chamædris enters into our gout powders. That such a bitter aromatic may be useful I will not deny; but how it comes to prevent the appearance of the gout in the extremities, we shall talk of when we come to the other ingredients which enter our gout powder.

The use of these plants I have found hurtful by long continuance. From the use of Sage-tea, I have several times observed a stiffness of the eyes ensue, the *palpebræ* not moving on the ball of the eye, and the eye liable to suffusion and inflammation. There are many other bitter plants to whom this quality has been ascribed.

Opposite to *b* stands the title

2. U M B E L L A T Æ.

This order is as entire and strictly natural as any other. Here the botanical analogy, applied to the *Materia Medica*, does not answer

swer well. All that are set down, are safe and innocent; but there are many of the same class, which we know to be of a poisonous nature. The former order mentioned, the *Verticillatæ*, and the following, the *Siliquosæ*, have no exceptions of this kind. The whole of those two orders have more of a common property, and none of them have a poisonous quality. This is not the case in the *Umbellatæ*, where it would be dangerous to push the botanical analogy beyond those substances which we have experienced. I have set down here most of this class, which are employed in medicine. In this list I have chosen to set down only those which are more simply stimulant; without any evacuant or antispasmodic qualities. Of most of those set down, the part in use, and in which their virtue resides, is the seed. I imagine most of the seeds of the *Umbellatæ* are of the same kind, but of this am not certain, but at any rate the analogy cannot be drawn to the leaves and roots. The Coriander seeds are agreeably aromatic, but come from a plant fœtid, and suspected of poisonous qualities. This has made people afraid of the seeds, but practice shews that they are perfectly innocent, when freed from any taint of the odour of the leaves. What is the effect of the leaves of the plants, is not known. Some of the leaves have less acrimony than the seeds. The leaves of the *Daucus Cre-ticus*, and the roots of the *Fœniculum*, are neither of them remarkably acrid.

There are four plants in this list whose roots are remarkably medicated, viz. the *Angelica*, *Levisticum*, *Pimpinella saxifraga*, and *Seseli Massiliense**. The roots of these four contain much of a warm aromatic resin, which they afford in an elegant form, when wounded in the spring; and it is to be lamented, that pains are not taken to collect our native resins of this kind. The *Pimpinella saxifraga* stands in the alexipharmic powder of Stahl, so much commended by him and his followers. For my part, I am uncertain as to its use, but certainly it might be applied to useful purposes. The seeds

* In another Copy, the *Hippofelinum* is mentioned, instead of the *Seseli Massiliense*.
of

of the *Umbellatæ* are what are chiefly known in medicine. These have all one common virtue. They are all in the common language carminative, *i. e.* antispasmodic in the *primæ viæ*, assisting digestion, relieving head-achs arising from crudity, dispelling flatulencies, and curing cholics. These virtues are certainly real, depending on an essential oil manifest in all these plants, which is remarkably aromatic, without acrimony, or suspicion of being of an inflammatory nature, and are, therefore, the safest of the *aromata* we can use in these intentions. As natives of Europe, they seem intended by nature for these cold climates, where there is so great a tendency to Inflammation. Hence they are very proper condiments for animal food, for which we improperly substitute the *aromata* of the Torrid Zone, which are designed for vegetable aliment, and are of an acrid inflammatory nature.

The seeds of the *Umbellatæ* seem peculiarly adapted in the case of children. These, from the acescency of their milk, are liable to cholic pains. Spirits, and weak punch, are often very improperly employed by the nurses. Anise seeds are very effectual for the purpose, as they act in an inconsiderable small dose, and therefore are safe, either as they are not in hazard of inducing bad habits, or stimulating too much. These are their real virtues. Many others are attributed to them. They are said to increase the milk of nurses. They do, indeed, come off unchanged in it, and sometimes, by condiment of this kind, given to the nurses, I have seen them so far conveyed to children, who laboured under Colics (either from their natural disposition, or from the nature of the milk) as to obviate entirely these complaints. It may be supposed, that as they pass unchanged, they may stimulate the excretories, and give milk; but for my part, I think this is injudiciously attempted, by any thing but proper nourishment, and if this fails, the complaint lies too deep for any medicine, by stimulating the excretories, to have effect. They are said to be diuretic, and the *Daucus sylvestris* has been employed for this effect; but I could never, even in considerable doses, observe its diuretic virtues. Though it may be said that it
passes

passes unchanged, yet its *stimulus* is so small that it would not produce the effect, much less in the small quantity in which it is given; and besides, I doubt the fact alledged, of its passing unchanged. Many others of the same class are said to be diuretic. As Antispasmodics, they may be useful in relieving the symptoms of Gravel in the kidneys, which may be considered as a spasmodic affection. This is an instance of the method I would chuse, in endeavouring to find out the mysterious virtues applied to medicines. These seeds, as diuretic, are said to be pectoral. I believe that if they were diuretic, they might also promote the secretion of mucus in the lungs; but as I suspect their diuretic virtues, much more must I do this. Here I would give you a caution, *viz.* that surely in inflammatory cases, the mischief they would do by their stimulant quality from their essential oil, would do much more than compensate any good they might effect from their evacuant virtue. Several of this tribe have been called Emmenagogue. When I come to the operation of these medicines, I shall shew, that there is scarcely any medicine specifically stimulating the *uterus*. As being of the *Verticillatæ*, they may, from their antispasmodic virtue, be accidentally useful, in spasms of the *uterus*. With little judgment have these seeds been distinguished into the *Calida majora* and *minora*. The *Fœniculum*, though one of the mildest, is ranked among the *majora*; the *Daucus Creticus*, though one of the most acrid, among the *minora*. What is precisely the rank of the different species, here mentioned, is not ascertained. It will not be difficult to do it from their taste, and the quantity, and the acrimony of their essential oil.

Opposite to *c* is placed the title

3. S I L I Q U O S Æ.

This is another natural order, without any exception from some of them having poisonous or deleterious qualities, and in general more exactly agreeing in quality, than the plants of any other natural order. I have confined myself to those which stand in our dispensatory lists. The others, as containing less of the common virtue, are neglected.

neglected. They are all substances of acrimony, and so are properly ranked among the Stimulants; but this acrimony is in so small a quantity, as to be so easily dissipated by boiling, that many of them enter into our food, and are properly, in these northern climates, employed as condiments with our animal food*. The share these substances have in aliment, I have formerly mentioned. As Medicines, they act suddenly and powerfully, and their *Stimulus* is quickly diffused, so that they are useful in all those cases where the motion of the nervous power is languid, weak, or obstructed, as in paralytic and apoplectic cases; where I have found no *Stimulus* better (as I formerly observed) than a little Mustard. Habit wears off these effects, and I have frequently seen Horse-radish, when Mustard failed, substituted with advantage. Used internally for any length of time, their effects, through habit, come to be trivial. Externally they are used with better effect, as we can encrease their power, by encreasing the surface to which they are applied; but it is difficult to get it with its proper qualities in that powdery form, which is here necessary. They have likewise an inconvenience, that, retained long on the skin, they are apt to be inflammatory, which is not near so useful as their first extensive impression. In most cases we should seek for the first operation, and avoid the last. As confined to a particular part in their action, we shall talk of them under the head of *Attrahentia*. They prove particular *Stimuli*, not from any specific virtue, but according to the place to which they are applied. Thus, in the stomach, while they act as promoting digestion in general, and as carminative in dispelling crudities, if strong they will prove emetic. Accordingly Mustard and Horse-radish are employed as gentle Emetics, as they are substances thrown up at first, and without continuing their effects. When the stomach is once set in motion, the vomiting, if that be found necessary, may be continued by repeated draughts of warm water, or with some of these *Stimuli* in it. The best method of exhibiting Mustard, as a vomit, is, first to give a table spoonful of it, diffused in a glass of

* Promoting those secretions which take off the alkaline part of our blood.

warm water, and afterwards, to add a little Mustard to every subsequent draught. Others are fond of Horse-radish in a strong infusion, of which a spoonful is given in warm water. In my opinion the Mustard is preferable; for the Horse-radish, as very volatile, loses its virtue, when kept, and, even in infusion, is liable to the same inconvenience, except that is performed in very close vessels; nor when the infusion is obtained, can it produce the effects proposed without large and nauseous draughts frequently repeated. If the emetic virtue of these substances does not take place, they are carried into the intestines, which they stimulate, and promote the evacuation by stool. In order to obtain the purgative effect, the seed is given entire; *i. e.* in the Mustard, commonly in the dose of a table spoonful. Of the same seed powdered we could not give ʒj. without vomiting, whereas I have seen even two table spoonfuls unbruised, which is ʒj. given without that effect. In this manner, Mustard seldom fails to move the belly, and answers very well for keeping a costive habit regular. Its effect in this case is difficult to explain. We can only suppose, that it is not extracted in sufficient quantity in the stomach to act as emetic, but is carried into the intestines, whose contents it stimulates them to discharge, in consequence of its quantity and successive action. Upon the same footing it may go farther into the system, before it has exerted any *Stimulus* sufficient to throw it out of the body. If given entire in such quantity as neither to vomit nor purge, it will enter into the blood vessels, where it is directed to the kidneys, and shows diuretic powers. All diuretics, by proper management, may be rendered diaphoretic. If the surface is kept warm, the medicine goes off by the skin; if it is cool, an increase of urine is effected, and the medicine is determined to act upon the kidneys. In this manner some of the *Siliquosæ* have been employed as sudorific, and a Mustard-whey has been given for this purpose. Here, as depending on its general *Stimulus*, the warmth of the whey to which it is joined, and the diaphoretic regimen, are its effects to be explained. All the *Siliquosæ* are somewhat of the same kind.

In

In consequence of their diuretic and diaphoretic powers, and their promoting the excretion of the acrid parts of our blood, have the *Siliculosæ* generally, and not improperly, got the title of Antiscorbutic, which every medicine is supposed to be, which promotes urine, without any considerable heating quality. The only cure of Scurvy is from throwing in a large quantity of vegetable aliment. As this class, then, are used in food, as they can be taken in considerable quantity, and as they are likewise proper as medicine, they are, without doubt, peculiarly adapted to this intention. As diuretic and diaphoretic, it is probably not without reason they are called pectoral. Something seems to be in common with the surface of the lungs and the skin; and Dr. Hales has shown, that a good deal of what we call sensible perspiration, goes off by that organ. As then the kidneys have an intimate connexion with the surface of the body, and as that again is connected with the lungs, it is probable that medicines which stimulate the kidneys and skin will likewise have effect upon the lungs, by causing secretion from their surface. Although it is difficult to explain, they seem to have a power of stimulating the mucous glands of the lungs, and it is probable, that in this way they are so often useful in diseases of the breast. Externally applied to the excretory ducts of these glands, they stimulate them, and hence are so often mentioned as curing hoarseness. *Eruca* and *Erysimum*, when fresh, are famous for this use. In producing this effect, they are said to add more than natural clearness to the voice: Whence, in French, one of them is called *Herbe aux Chantres*. The method of using them is to make them into a syrup, a small quantity of which is laid on the tongue, and swallowed slowly, by which means they come to be applied to the mucous glands of the *Trachæa*, whence we may suppose their action extended to the *Bronchiæ*. These virtues I have had confirmed by experience, but have not confined myself to the *Eruca* or *Erysimum*, but have used the Horse-radish with the same advantage. These are the common virtues of the order. The particular species of this order only differ in degree of virtue, *i. e.* in proportion as they have their acrimony more or less in comparison to the other parts. With regard

to their order in point of strength, it does not appear to be properly determined by experiment. We shall only observe, that the Mustard, as a seed, the Horse-radish, as a root, and the Scurvy-grass, as a plant, are probably the strongest of the kind, and those we are best acquainted with.

The virtue of these Stimulants (as of most other classes) are not accompanied with other qualities, Bitterness, Astringency, &c. The *Siliquosæ* have indeed a bitterness in common to the whole class, from their peculiar acrimony. Some, however, are said to be astringent. The *Bursa pastoris* has been said to be so, but, upon trial, I have found little qualities in it. The virtue of the *Siliquosæ* is not only more in common, but more equally diffused over the plant, than in any order I know. If there is any distinction to be made, I think the strongest acrimony is lodged in the seeds, the next strongest in the roots, and the weakest in the leaves. Hence these last are the most proper Antiscorbutics, as they can be thrown in both as a food and as a medicine, in the greatest quantity. The virtue of all these resides in a very volatile substance, for it is dissipated in drying. When fresh, this volatile principle comes over from the plant, in distillation with water. Hence it has been supposed of a saline nature, but more accurate enquiry now shews us, that it resides in an essential oil of this peculiar property, that, though extremely volatile, it is yet specifically heavier than water. It remains (for I have not tried it) to enquire whether this oil has the same volatility when separate, as in the plant. It must not only be stopped with common stoppers, but kept with water under ground. It may be a subtile spiritus rector, a smaller portion of the oil that is thus disposed to fly off. With this acrid, volatile, essential oil, these plants shew they also contain an expressed oil, which is not only a curious fact in chemistry, but also in the anatomy of the plant, and which we should not have expected *à priori*. These two oils are lodged in different parts of the seed, otherwise, on expression, a part of the essential oil would always come away with the expressed.

As

As to the exhibition of these substances, they always ought to be given in substance entire, especially in the Scurvy, in order that we may give a vegetable aliment along with our medicine, without which the Scurvy cannot be cured. The essential oil of the plant, though diuretic, &c. would not answer, unless also the expressed oil were joined with it, in the entire state, to assist in affording the aliment we spoke of; and I am persuaded, that though the essential oil were never so well extracted and preserved, it could never cure the Scurvy. Though this be really the case, yet if the essential oil could be extracted at a moderate expence, or give a strong impregnation to spirit, it might serve for other purposes in which these medicines were recommended, especially in paralytic cases. In the mean time, we know no other preparation but the syrup, which answers not only for hoarseness, but in paralytic cases, and, as I have seen, in pectoral. In making this, we should confine ourselves to the seeds and roots. Horse-radish is the most fit of any. This is not so succulent as that it can be extracted by expression. As a very volatile subject, it should be taken fresh, scraped down quickly, and let fall into water, to prevent the effects of air, then shut up in close vessels, and set in balneo, and, after standing there for some time, be taken out, and expressed upon a sufficient quantity of sugar, with which it may be again committed to the bath, with the same precautions, and afterwards corked up in small vessels, in order that, when it is opened, it may be quickly consumed, and have as little of the bad effects from the air as possible.

Opposite *d* is placed the term

A L L I A C I Æ.

Though of a very different botanical tribe, I have set these down immediately after the *Siliquosæ*, as agreeing with them very much in medicinal virtues and chemical qualities. Even in sensible qualities there is a resemblance, and one of the *Siliquosæ* is called *Alliacia*, from its alliaceous odour. The *Alliaciæ* and *Siliquosæ* agree, too, in having their virtue residing in a volatile principle; and in having that volatile principle residing in an essential oil, which sinks in
water.

water. The only difference is, that the *Alliacea* contain more of a mucilaginous matter, which, when their acrimony is dissipated by boiling, shews more of a nutritious, and, if you will, demulcent quality. Neither, indeed, is their acrimony so volatile, or so immediately active as that of the former class, nor so extensive in the propagation of their stimulus, if they are equally acrid. Hence they are not so frequently employed in paralytic cases; but, bating these differences, their diuretic, diaphoretic, and pectoral qualities, stand upon the same footing as those of the *Siliculosae*. There is, too, a farther analogy, that, if exhibited in the same manner, they are apt to affect the stomach with pain and vomiting. If intended to be conveyed into the mass of blood, they ought to be exhibited in their entire texture. Thus the cloves of Garlic ought to be dipped in oil, and swallowed entire, for the common Garlic pill will seldom prove diuretic. Sometimes, indeed, that pill grows pectoral, but never so considerably as in the other manner. The Syrup of Garlic is the only preparation which is a good one; and proper directions for it may be seen in the London Dispensatory. The Garlic, like Mustard, will act as an external stimulus, and, except from its disagreeable odour, answers equally, and may likewise be very properly applied to the extremities in low fever. The Garlic is not so liable to ulcerate the part, but is more apt to be absorbed and to extend its effects to distant parts. Some say, that this is pectoral externally applied, but I have never been able to observe this effect.

As to any difference in the *Alliacea*, it is only a difference in impregnation and strength. The *Allium*, *Cepa*, and *Porrum*, are placed in the order of their virtues, the *Allium*, the strongest, &c. A peculiar virtue has been attributed to the *Porrum*, viz. a narcotic quality. This quality, however, is doubtful: I know one or two instances which seem to favour it, but I have also known it given in considerable quantity without that effect.

Opposite to *e* is inserted the title,

5. CONI-

5. C O N I F E R Æ.

The virtues of these are manifestly as much a-kin as their botanical qualities, I mean of those here set down; for it is not known, whether we can extend the analogy to other plants or trees of this order. The *Taxus*, *e. g.* is suspected of a poisonous quality, which indeed I shall not determine if it possesses; but certainly it must be granted, it is more acrid than the rest. All the three of this order set down, the Fir, the Pine, and the Juniper, possess that peculiar acrimony, which is called, by Floyer, the Terebinthinate; and indeed their virtue seems to depend on a Turpentine. There seem to be some exceptions, but either in medical or chemical qualities there is little difference, except in odour. They all afford the same essential oil as is extracted from Turpentine. It is on this account that I have set down that substance, and others which are a-kin to it, under my next title, which should be placed at *f*, *viz.*

6. B A L S A M I C A.

The title of Balsam has been applied to oily or resinous bodies of a middle consistence, betwixt oil and resin. These are commonly obtained from the *Coniferæ*, and all approach to the nature of our Turpentine. Of Turpentine, and the four Balsams that follow, I am apt to think the virtues very much in common, and nearly the same in all. All have manifestly the power of stimulating the intestines, whether thrown in by injection into the *anus*, or swallowed by the mouth. Hence the Peruvian Balsam has been recommended in that dry belly-ach, which is called the *Colica Pictonum*. We know the daily use of Turpentine in clysters, and, indeed, in my opinion, it is one of the best substances we use for that purpose. Wherever there is an obstinate costiveness, Turpentine answers much better than saline matters; not that it is a stronger stimulus, but that it is more durable, and more certain, remaining longer than the salts, which are soon thrown out, from their stimulus. The Turpentine, too, is much better than acrid purgatives, which often increase the disease. This effect.

effect is not peculiar to the Turpentine, but also exists in greater perfection in the *Balsam Copaibæ*. Guaiac, too, has been used as a purgative, and I make no doubt but the Balsams of Gilead and Tolu would act in the same manner. All carried farther, seemingly into the mass of blood, are diuretic, diaphoretic, and pectoral, perhaps on the ordinary footing of stimulating excretions, which have so much in common. More especially do we observe their diuretic effects, in so far as we can perceive them passing off in substance, by the urinary excretion. Turpentine, and the other Balsams, give what is called a violet odour to the urine; but several times have I found it the same as that of Turpentine itself. Fuller tells us, that *Balsam Copaibæ* gives a bitterness to the urine; but on having this tried, I did not find any such effect, but just the same as is given by other Balsams.

All these substances contain somewhat saline, resembling much such an acid substance as is got from Benzoine. Such a saline matter I have seen concreted in Turpentine, which some have said they extracted by itself, and the same thing is observable in Peruvian Balsam. Possibly their diuretic virtues may depend upon this Salt, and all of them contain an acid of the same kind. Constantly, by *Materia Medica* writers, have they been recommended in the *Nephritis*, but the propriety of the exhibition here is very doubtful; as these cases are generally attended with an inflammation, which would be rendered worse by *stimuli*. Surely if sand is impacted in the *tubuli uriniferi*, or ureters, we must use antispasmodics and relaxants; for in such cases the use of *stimuli* would be very dangerous. If it be confirmed, that the *Uva Ursi*, and other astringents, have such good effects in diseases of the kidneys, we may very safely say with Ovid,

Parce, puer, stimulis, & fortius utere loris.

I myself have seen the bad effects of Stimulants in such cases, in producing inflammation in the neck of the bladder. These Balsams have been constantly supposed of a drying power, and recommended
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in gleans; and as they affect the urinary passages, in what is contiguous to them, the uterine. They have also been recommended in *fluor albus*. Their effects in such cases are confirmed by experience. It is difficult to explain how they act. They do not act by their astringency; for they possess no such property. They are said to have an agglutinant quality, and from this is their operation explained in wounds, and ulcers. Even in such case they do not act from such pretended quality; and although it should be granted they did, yet we can never suppose they act in the same manner in the urinary passages; nay, the same virtue resides in the oil, and other Stimulants have the same effect. I have seen *Cantharides* cure both the *fluor albus* and gleet, and nothing but its very acrid qualities, and the uncertainty of its action upon different people, hinders, in such cases, its more frequent use. From this view, I think there is no sort of doubt, but that our Balsams act in such cases, by bringing an inflammation on the lax vessels, inducing in them contraction and firmness. Several accidents tend to illustrate the same theory. I have seen persons cured of an obstinate gleet by long journeys, and riding post, &c. Injections of Calomel I have seen given in such quantity as to produce an inflammation, which it was necessary to calm by repeated bleedings, have the same good consequence. Corrosive Sublimate I have seen produce bloody urine, but at the same time cure the patient; and something also of the same kind I have seen occur from *Bals. Copaibæ*. All this ought to make us cautious in the use of those medicines; as it is very difficult to measure the inflammation, and proportion the dose to what degree of it we would produce.

As to the pectoral virtue of the Balsams we are speaking of, it must be admitted on the same footing as that of other Stimulants. In some asthmas without fever, where the excretion of mucus is stopped by spasmodic affections, our Balsams may promote that excretion by their antispasmodic virtue. Their use must not be promiscuous. These, and the Balsams of Sulphur, were formerly employed in all diseases of the breast, and even in ulceration of the

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lungs,

lungs, but as producing that inflammation, which is in such a case so dangerous, they are now in such intention properly laid aside.

With regard to the diaphoretic virtue, they have it in so far as they are diuretic; but though they are diaphoretic by stimulating the excretions, yet they also seem to be so by acting on the stomach. I have seen Guaiacum exert this property before it entered the intestines; and Oil of Turpentine before exerting its diuretic quality, which, however, afterwards it did. The diaphoretic virtue of these Balsams seems the foundation of their use in the Sciatica, in which disease Pitcairn gave Oil of Turpentine, in doses of * ziv . or zij . with success. For my part, I never could come up to this dose; from the heat and uneasiness produced in the stomach. Sometimes, however, even in the small doses in which I could exhibit it, I have seen good effects in Lumbagos and Sciaticas; but as often have I given it without any relief, and have sometimes seen inflammation occasioned by it. On the same footing is the use of Guaiacum in the Rheumatism, in which it is supposed specific. In the *Angina*, where there is no inflammation, it may be useful by promoting the diaphoresis; but in the case of inflammation, it always does harm, and I have often in such cases seen the effects of it very difficult to remove. In several chronic rheumatisms it is useful. In gouty cases, in so far as it stimulates the stomach, it may be useful; as every medicine in that disease will, which stimulates only to that degree, as to strengthen. Guaiac, too, is said to prevent the Gout in the extremities. How far that ought to be done by this, or any other medicine, shall afterwards be mentioned.

These are the common virtues of our Balsams. They have virtues depending on their essential oil, which, perhaps, in proportion to the quantity they contain of that, they will exert more powerfully. Thus the *Bals. Copaibæ* has much more oil in its compo-

* In another copy the doses expressed are from one to two drachms, which seem to be nearer the truth.

tion, and is more powerful than the Turpentine. The others in this respect are not examined. Odour, too, may be supposed to vary the virtues of these Balsams ; but a very great odour may reside in a very small quantity of matter. Whatever, then, may be said of the *Bals. Gileadense* in the eastern countries, I do not know, as upon proper trial I have not examined its virtues ; but, *à priori*, I should expect little from it. I should much rather prefer those which are cheaper, and less apt to be adulterated.

All these Balsams are apt to stay long upon the stomach, and I have known Turpentine continue there for several days in some cases, with troublesome symptoms. In whatever manner they are divided, whether by yolk of egg, or more elegantly by mucilage, they are soon collected, and resist the power of the stomach. Hence I imagine, we should get a better medicine by applying spirituous menstrua to Fir-tops, &c. than by giving the Balsams themselves. Of Fir, the Leaves and Tops may be employed, and Berries of the Juniper are in common use. Whether we obtain a sufficient impregnation, I shall not determine ; but certain it is, that I have seen Juniper tea cure gleans, equally well as the *Bals. Copaiba*. These grow in greatest perfection in the warm climates ; and in Holland, where they are much used, they get them from Italy. If such could be got, they would certainly answer. Geoffroy relates that they produce bloody urine, which gives a caution in their exhibition even in their mildest state. Hoffman gives a great character to the residuum, remaining after the infusion of Juniper Berries, for strengthening the tone of the viscera, and of the stomach in particular. He speaks of it as astringent. I have, on trial, neither found the astringency, nor the effects he mentions. The substance was rather of a sweetish nature.

The Guaiac answers as well as any of these Balsams, and is of more convenient exhibition. Perhaps the friable Balsam of Tolu would have the same advantages, but hitherto it has not been employed.

Next the Balsams mentioned, stand

M Y R R H and L I Q U I D S T O R A X.

Of Liquid Storax I am uncertain what to say. Whether there be such a vegetable exsudation as this is said to be, I am doubtful. Certainly what we have in the shops under this title, is an artificial substance; and Hoffman relates his knowing a man in Berlin, who manufactured it in considerable quantity. Its sensible qualities give us no reason to make any preference of it to the others.

With regard to the Myrrh, it has been of long and frequent use, but by no means are its peculiar virtues ascertained. It has been commonly, but improperly joined with the foetid gums; for it differs from them in its sensible qualities. In its taste it is resinous, and of an oily nature; it comes nearer to our Balsams, and it is on this account that I have placed it among them. It is acrid in the *primæ viæ*, stimulates the intestines, and, as joined to Aloes, may increase its purgative virtue. I was present at some experiments intended to ascertain the virtues of this medicine. In the dose of ʒss. it heated the stomach, produced sweat, and agreed with the Balsams in affecting the urinary passages. As commonly joined with the foetid gums, it has been supposed to promote the menstrual flux; but this virtue is only in common to it with other Stimulants. It does not, as the Aloes, &c. act by rarifying the blood.

Opposite to *g* stands the term

L I G N A, W O O D S.

Although I have used this common term, it is not from any relation. It is sometimes very difficult to say to what class medicines are to be determined. I have set these here together, as commonly used in the same prescriptions.

G U A L-

G U A I A C U M .

This wood certainly contains in its substance all the virtues of the Gum, but then this cannot be extracted from it, but by a spirituous menstruum. Its share in the *Tinct. Sennæ composita* is recommended by Dr. Lewis as a considerable improvement to that medicine. He says, that ʒij. of Senna, infused in ʒviiij. of Decoction of Guaiacum, will work as briskly as ʒiij. in plain water. The fact is certainly true, but it is owing merely to the largeness of the menstruum; and I have known two pounds of Decoction of Guaiacum given without purgative quality. I say it is owing merely to the largeness of the menstruum. For ʒij. of Senna, infused in ʒviiij. of water, will have equal effect with ʒiij. in ʒiv. The Decoction of the Woods is a medicine of little efficacy, and, I imagine, wholly insignificant. The virtues of the Woods reside in an essential oil, which cannot be extracted with little boiling, or a small quantity of menstruum. If the coction and the menstruum are increased, the essential oil is dissipated as much as the quantity extracted is enlarged. In short, during a practice of thirty years, I have never seen one cure performed by it, so that it does not matter whether we allow the impregnation or not. It has been reckoned specific in venereal cases, but it is only efficacious in these in so far as joined with a sweating and emaciating course; by which means the fluids are changed, especially that in which Boerhaave supposes the venereal poison to reside, the oil of the body. Although I do not entirely agree with Dr. Boerhaave in this notion, yet I am convinced that the emaciating course is what in this case has the sole effect, and the *Decoctum Bardanæ* will answer equally well with that of Guaiacum.

S A S S A F R A S .

This is commonly joined with the Guaiacum, and is, for that reason, placed here, though a substance of very different sensible qualities, and instead of a thin essential oil, affords one of the greatest specific gravity we know. As differing, then, in its sensible qualities,

lities, and likewise in class, we must suppose it a different medicine. With regard to its use, we make this observation, that wherever we lose sight of Stimulants promoting a certain evacuation, we must be very doubtful as to their effects; nay, stimulating the system in general may have very bad consequences. There is no doubt of Sassafras being a Sudorific, and to this I confine its virtue.

SANTALUM, SAUNDERS.

This Wood is now hardly known in practice. It affords an oil like that of Sassafras, which may be extracted by solution or distillation. I speak this of the Yellow Saunders. It is, however, a substance of little use, and properly neglected in present practice.

The three substances which stand next to the Woods, have no proper relation or affinity with them; but because they have been employed likewise in venereal cases, they are set down along with them.

RADIX CHINÆ.

This formerly had some reputation in venereal cases; but as I have hardly ever seen it in our shops possessed of any sensible qualities, I imagine it is with some reason that it is now banished from practice. But let me observe, however, that it is of the same genus with the Sarsaparilla, which has little sensible qualities; so that if virtues are found to reside in the one, it is probable they also exist in the other.

SARSAPARILLA.

This has little sensible qualities, and any that it has, are not obtained but by long coction; so that upon the ordinary method of reasoning, it ought to be thrown out of practice. About twenty years ago it was reckoned insignificant, but lately the Physician at Lisbon having done great service in venereal cases, by what is called the Lisbon Diet-drink, many conjectures were about its composition,
and,

and, among other things, it was supposed to be no other than a decoction of Sarsaparilla, and this came again into practice under the reputation of curing venereal cases, in which Mercury failed. Fordyce, in the London Medical Essays, gives us several cases, in which Sarsaparilla was of considerable service. Whatever, then, we may object to the difficulty of finding an explanation for those virtues, to its want of sensible qualities, &c. yet the cases mentioned make me see foundation for the use of Sarsaparilla in practice. Fordyce condescends upon particular times of the disease. None of the cases, in which Sarsaparilla cured, were recently venereal: It seemed necessary that Mercury should have preceded its exhibition, and that in considerable quantity; so that its use seemed preferably confined to such cases as Mercury had failed in. We in this country know no proper *Lues*, and I have seen no case in which Mercury failed; but certainly there may be such, arising either from mismanagement, and perhaps the bad effects of the Mercury, or perhaps the inveteracy of the disease itself. Whatever is in this, Sarsaparilla is chiefly directed in pains of the bones, from such circumstances either arising from cold, &c. yet surely venereal. This I would take as a test of the efficacy of the Sarsaparilla, that in such pains where the patient had not slept for a considerable time, the exhibition procured ease and rest. If in such cases, after such testimony as has been given, it fails, I would alledge, it was from the badness of the Sarsaparilla, or the inaccuracy in preparing it. I think that the first case is very common, for I have never seen it with any sensible qualities; and in one case where it had, they were different from those ascribed to it by *Materia Medica* writers. I forgot to mention; that Sarsaparilla was recommended in cutaneous diseases from a venereal cause. A very strong impregnation and decoction of this plant is necessary. It becomes sooner acid than any impregnation any other dry root affords.

C O N T R A Y E R V A

Comes from a plant of some, though not considerable acrimony, with little, but peculiar odour. It may therefore be, as is supposed,
diapho-

diaphoretic, or, as *Materia Medica* writers call it, alexipharmic. It is used in malignant, low, nervous Fevers, to support the *vis vitæ*, and promote sweat. With regard to the use of acrid medicines in Fevers, I find it very difficult to know when they should be employed, nor can we do so till we have got a farther light into the theory of fevers. With regard to those who consider Fever merely as an increased motion of the fluids, I cannot think when we should use them, except we also take in something, that during the whole is continually weakening the nervous power. I used to solve this difficulty, by alledging, that the medicines we employed were not really Stimulants, but Antispasmodics. Most of them are so, but there may be cases where simple Stimulants are useful; but of this afterwards in a more proper place. At any rate I imagine, that from the manner and quantity, (*viz.* three grains,) in which we exhibit *Contrayerva*, that it is only a part of our rosin, and possesses no virtue at all. Of late Dr. Pringle has introduced a new consideration in Fevers, the exhibition of Antiseptics. I will not deny that these may do good, but in the quantity we exhibit them, (*Contrayerva, e. g.*) their effect is extremely doubtful.

The medicines we have been now talking of were classed according to the botanical analogy, and, properly speaking, were introduced by the *Coniferae*. We now come to medicines classed from the analogy of the sensible qualities. Opposite to *b* is placed the title,

AROMATICA FRAGRANTIORA.

Such medicines are termed aromatic, as join with a pungent acrid taste a fragrant odour of the agreeable kind. They all abound in an essential oil, which in the proper aromatics is specifically heavier than water, and are generally natives of the Torrid Zone. The whole of our list do not exactly agree in these characters, but are some of them set down for the sameness of their essential oil, &c. They are distributed into *fasciculi*. The first six are best entitled to the appellation in every view. All of them have qualities very much in common;

mon; they stimulate the stomach, assist digestion, and increase appetite; in a stronger degree take off spasms in the *primæ viæ*, by maintaining the stronger action of the stomach; take off spasms arising from vegetable aliment, and, in general, except in inflammatory cases, are useful in all spasmodic affections of the alimentary canal. However, they seem rather appropriated for relieving those spasms when they occur, than to obviate them. Nothing is more common than to give aromatics with purgatives, which are liable to produce spasms; but in obtaining the pretended effect of their obviating such, I have been frequently disappointed. On other occasions, Aromatics are used in all cold diseases of the head and brain, in all languors of the system, and, in short, for all the purposes of Stimulants. All of them are of an inflammatory nature, having their virtue depending on an essential oil, and apt to inflame the part to which they are applied. Those Aromatics are most so which have this oil in greatest quantity, and of the most acrid kind.

They have been employed in the case of Intermittent Fevers, in order to obviate the return of the fit, but by this practice we are always liable to change an Intermittent into a Continued Fever. Many Intermittents are of an inflammatory nature, especially those of the spring season; and in these especially would aromatics be improper. These are the virtues of Aromatics in general, and are applicable to each.

Though distributed into *fasciculi*, I do not well know how to distinguish them. The first six are the most proper Aromatics, most agreeable, and most used in food. The *Canella alba*, *Cortex Winteranus*, and *Ginger*, are of inferior degree of fragrancy, but still are entitled to be ranked with the others. The *Pepper* and *Capficum* have little odour, but most poignancy of taste, and are the most powerful; which is an evidence of the small efficacy of odour in giving virtue; and from the want of odour they are more recommended in food in certain circumstances. The essential oil extracted from these, is milder than their substance; which shows, we should

not always suppose we have extracted all the virtues, where we have extracted the essential oil, for often that is so heavy as not to rise. Alcohol, in such cases, affords the best impregnation. Pepper, like Mustard, can be taken in six times the quantity when whole as in powder, without producing the same heat. In Intermittents, where Pepper is commended, this is the proper method of exhibition; for by this means the stomach cannot extract such a considerable quantity at a time as to produce inflammation.

The next three have not an odour of the fragrant kind, and therefore are not used in food. They have no other virtues but those of the foregoing, and might be safely rejected, were it not to afford that variety which is sometimes required to adapt Stimulants to particular tastes.

The next three substances ought to be separated from this class; for though possessed of an acrid taste, they have a disagreeable odour, and may be of different virtues.

Galangals were introduced when we were in the humour of introducing every other medicine. It is neither agreeable in odour nor taste, and is the weakest of the class, and therefore now properly rejected.

Zedoary has a penetrating odour, like that of Camphire, and is said to afford a concrete of much the same nature, and therefore probably has antispasmodic virtues, which, however, are not yet ascertained.

Serpentaria Virginiana. This contains an acrid essential oil, and therefore is possessed of the virtues of the Aromatics. Its odour approaches nearly to that of Valerian. Perhaps it is too frequently prescribed in the Edinburgh Dispensatory. Surely as an Aromatic it is less agreeable than many of the others. It is supposed of peculiar virtues. It is almost the only Aromatic we use in continual Fevers,

Fevers, and I have seen it of good effect in low nervous Fevers, raising the pulse, diminishing its frequency, and bringing the Fever to a happy issue. It is certainly preferable to the *Contrayerva*. We call those Fevers low and nervous, in which there is always a languor of the *vis vitæ*, and of the nervous power. When this proceeds to a higher degree, and is accompanied with putrefaction, we call the Fever malignant. In the last case, in the malignant Fevers, the *Serpentaria* is often evidently useful, and in the beginning of nervous Fevers, where there is no manifest putrefaction, it is often of pernicious consequence. Dr. Pringle has been very attentive to malignant Fevers, and deserves great praise for his observations on them, though sometimes he is apt to suppose their existence oftner than it really is. From his notion of antiseptics he was led to exhibit the *Serpentaria*. But he himself gives us a caution, though prejudiced in its favour, *viz.* that he was now obliged to diminish his dose, from the heating effects of this medicine. These heating effects are not sometimes to be measured by the temperature of the skin, but the frequency of the pulse. Though I have often seen good effects from this medicine, yet, as they are always very doubtful, as malignancy seldom occurs here, and as I can obtain its good effects from medicines of a less inflammatory nature, and which I can exhibit with greater safety, I have now laid it entirely aside.

Of the five next following, the *Malabathrum* and the two *Nardi* are now entirely neglected. The others manifestly contain somewhat of aromatic virtue, but so weakly, that they have neither deserved nor obtained reputation. Those of them whose flowers we use, always lose their virtue before they come here. Nay, even those which are reared in this country, the *Balsamita*, *e. g.* and *Costus*, have no peculiar virtue.

Lilium Convallium. This is an instance of odour introducing a substance into medicine improperly. Though agreeable and fragrant, yet it is an acrid, even poisonous substance, and, as having no virtues depending on its odour, carefully to be avoided.

Ginseng. This, like other substances which have come into common use, has had great virtues ascribed to it, especially in the countries where it is in common use. It is a mild Aromatic, and, to those who require such amusement, a safe masticatory. It may be of use, but the weakness of its sensible qualities give it no foundation for a place in medicine. The engaging virtue of a powerful incentive and aphrodisiac has been attributed to it, but on the most slender, and, indeed, absolutely false foundation.

Cascarilla. In this country, and indeed England, this is little known as a medicine, but much used in Germany, and other countries. Its history is related by Geoffroy, and transcribed by Dr. Lewis, neither fully, nor accurately. In Germany its reputation is fallen of late, and its virtues are disputed. This with me, as with many others, has prevented any trials with regard to it. It belongs to a set of plants, which contain an acrid and somewhat of a poisonous nature. Its oil is very inflammatory, and as so irritating and heating the system, and promoting sweat. In some cases it may be useful; in those, *e. g.* in which the Germans recommend it. It has somewhat of a narcotic power, and as a bark manifestly astringent. G. Alpinus employed it in malignant Fevers. Juncker says that it does not answer in present practice; but that may often happen, from our not knowing the cases to which it is appropriated. Juncker and Stahl recommend it in Intermittents, but there it is by no means equal to *Peruvian Bark*, which Stahl, from his system, avoided. From its astringent and narcotic qualities, it might have been useful in those cases, in which the French Physicians employed it, and its other sensible qualities will explain its use in other cases. Stahl recommends it in Peripneumony, and Diseases of the Breast. He excepts the *Angina*, which makes me very doubtful about its use in the other cases.

Aspalathus and *Rhodium.* Had I intended to swell out my Lectures, I might have spoken of the various appellations of *Aspalathus*, &c. but on such disquisitions I have nothing new to say. I avoid useless

less and uninteresting subjects. They have a fragrant, agreeable odour, on which no virtues seem to depend, and the only one attributed to these woods is that of cordial. They seem, then, to be very properly neglected, and more to be regarded by the Perfumer than the Physician.

The three following Gums could not have been ranked with any we know, except with the *Balsamica* before mentioned, to which they seem to be akin.

Benzoin and *Storax* are remarkable for giving out a saline substance, of the acid kind, in a dry form, under the name of flowers. These volatile saline acids are certainly found in the Balsams, and no where else that I know. The Balsam of Peru is said to give out such in considerable quantity, and I myself have seen it concreted in turpentine. This saline substance in our Gums, is joined with a resinous matter of remarkable acrimony. To both the Flowers and Gum have been attributed the same virtues, which makes me, indeed, very uncertain about them, as it is what I cannot possibly imagine. They are said to be pectoral. I have seen them exhibited without shewing any antispasmodic power, or promoting expectoration. In general, we ought to be very cautious in exhibiting stimulant Pectorals. Being not employed in present practice, though not a proof of possessing, may yet be one of our knowing no virtues in the Storax or Benzoin. Although they had virtues, they could scarcely appear in the dose employed. The *maximum* of *Materia Medica* writers is ten grains. I have seen them given in twice the quantity without any effect at all.

I cannot say that *Labdanum* is placed very properly between the two foregoing. It is employed in plaisters, and, with the other warm Gums, may have its share in stimulating.

We now come to a set of Medicines, whose titles stand opposite to *i*, which are very commonly employed, but whose effects on the system are very difficult to explain.

9. A M A R A.

This term is to be considered as very general, and running through a great part of the *Materia Medica*. The *Amara*, however, are seldom simple, but combined with other qualities, as stypticity, acrimony, aroma, &c. When I speak of Bitter, I mean pure and simple Bitter, as that occurring in Gentian, Bile, &c. In my list, I have not exactly confined myself to this; but considered as bitter those medicines in which that quality is chiefly prevalent. With regard to all these plants, a certain degree of stimulus is to be perceived in them, depending on an essential oil, in greater or smaller quantity, giving distinction to the Bitter. But this essential oil, as some have imagined, is not that part in which the Bitterness resides; for on drawing that off, the Bitterness remains in its full force, only more pure. It must be confessed, however, that in some particulars the Bitterness does seem to reside in the essential oil. More or less of Stypticity is commonly joined with Bitterness, and cannot be separated from it, though discoverable by striking black with a solution of Green Vitriol. It is commonly said, that Bitters give more fixed alkali than other plants, and from a variety of trials I believe the fact to be true. What is to be inferred from this is very uncertain. The chemists imagine they contain this, in the mixt, in the same state; but in this they are mistaken; and though Bitters check fermentation, it is very far from being in the same manner as an alkali, which acts by destroying an acid.

The common VIRTUES of BITTERS are these:

All are more or less stimulating and strengthening, hence are supposed to promote appetite, and assist digestion. In the *Stomach* they check fermentations of all kinds, on the one hand preventing a noxious acid, and on the other resisting putrefaction. It is very probable, that their assisting digestion depends as much on this resisting putrefaction, as on their stimulant quality; for many substances which contain more stimulus, are without that effect. Many Bitters excite
vomiting,

vomiting, but without any emetic power, as has been supposed. Universally they are nauseous; and, when taken in warm water, expedite, rather than promote vomiting. The proof is this, that if a slight impregnation be equally nauseous, it will be as effectual as a strong one; and that given in powder, so as to pass the fauces without being tasted, they have no such property.

In the *Intestines* their stimulant virtue is better founded. Their taste resembles the bile of animals, and seemingly in the same manner as that does, they seem to promote the peristaltic motion. In trying Chamæmile for the curing Intermittents, I have given it in the dose of ʒj. without any proper purgative quality; though I must own, in such quantity it commonly moves the belly. In the intestines we must mention their anthelmintic quality. All animals seem to shew an aversion to the Bitters, and there are instances of insects avoiding their odour, which possibly may be the case with worms; and undoubtedly if these creatures swallow them they may be destroyed, as Bitters are possessed of a poisonous quality. But we now know, that anthelmintic bitters are of very little efficacy, and Physicians suppose they act by strengthening the tone of the intestines, and shaking off the mucus, in which the eggs of the insects are contained. This, however, cannot be proved.

In the *mass of blood*. I have seen Bitters pass off by urine, in some cases giving colour and smell to it, and at least changing its condition. Bitters have been recommended in the Jaundice. The virtues, as we have formerly said of all medicines recommended in this disease, are much to be suspected. I must now own, that after the use of Bitters, when the urine flowed yellow, its consistence and condition was changed. As promoting urine, they have been used in Dropsies. By themselves, their effects here are not very remarkable, but are promoted by union with alkaline salts. These two medicines seem mutually to increase each other's powers. Bitters are said to be diaphoretic and sudorific; and actually, in large doses, and under proper regimen, they will excite sweat as soon as
any

any medicine I know. Whether this virtue is to be imputed to their action on the skin, or on the stomach, is dubious. From the suddenness of their effect, the latter is the more probable case. In consequence of their diaphoretic virtue, they are recommended as alexipharmics in Fevers, in which cases they may be given with more safety than the Stimulants formerly mentioned, or the *Serpentaria*. In consequence of their alexipharmic virtue, they have been supposed Deobstruents in the whole of the system, and used in rheumatic affections. They have been supposed, too, as Stimulants, to promote the hæmorrhoidal flux, and that of the menses. Aloes has been alledged as an instance of Bitters promoting those fluxes, but in that the Bitter is joined with a subtile purgative quality. In hæmorrhoidal cases, in great quantity, they may be of some service; in the ordinary quantity we employ them for the menses, they are of none. As strengthening the system, they have been used in the cure of Intermittents. They certainly will cure; but, after repeated trials, I have found them not near so powerful as the Bark.

They have also been employed in continued Fevers, but the particular cases in which they are proper, are difficult to determine. They have been supposed to remove obstructions in the abdominal viscera, and have been called Hepatics and Splenetics. Their specific property I cannot conceive. They may be useful in Obstructions of the Liver and Spleen, as in those of the other abdominal viscera, and therefore may be employed in cachectical cases. In scrophulous cases, if the Peruvian Bark be found of advantage, we may infer the analogy to other Bitters. Bitters have been supposed to cure the *Gout*, and in one shape they really do so.

Not long ago, in England, the Duke of Portland's Powder came into great reputation. It is composed of the *Aristolochia*, and four other Bitters; for I consider the *Aristolochia* as a Bitter; though from its foetid odour it be transferred to another class. This powder, in the Duke of Portland himself, and in many others who
used

used it, prevented the painful return of the Gout in Inflammation of the extremities, and thus seemed to cure the disease; but almost always with a considerable change in the system, and pernicious consequences. I may venture to say, that ninety of an hundred, who have taken this remedy, in a year or two after have been carried off by apoplexy, &c. or some other mortal disease. In Scotland only twelve or fourteen persons have taken this powder, and all have done it with the consequences I mention. The course of the medicine must be continued for two years to produce the cure proposed. Many have not had patience to go through this course, and therefore with them the medicine has neither had the effect of curing the Gout, nor of bringing on any other disease. All this I mention from my own knowledge. For the history, &c. of this medicine, you may look into a paper of Dr. Clephane, in the London Essays, where he shews us it has been mentioned by every practical Physician, since the time of Galen. Some alterations, at different times, have been made in the prescription; but such as allow it always to be considered as a bitter medicine. At the same time that Authors recommend it, they have always subjoined a caution as to its use. Upon its reputation in England, trial was made of it; and Gaubius gives testimony of its having the same effects we have said. Such is the state of the facts with regard to this use of Bitters. How they act in either case, we shall not take upon us absolutely to determine. This may throw some light upon any method, which may be taken to explain it. We have said that Stimulants destroy the tone of the stomach. Boerhaave, in a work, which, as spurious, I should not quote, were I not certain of the fact alledged, in his *Prælectiones* on the *Materia Medica*, tells us, that *Aristolochia* destroys the tone of the stomach, smooths the inner side of the stomach, and takes off its villous coat. From all this we see how sparing ought to be the use of Bitters in stomach complaints. But as the Gout seems to be sent to the extremities, by the tone of the stomach, we in some measure conceive how Bitters act in preventing the appearance in the extremities. Whether it is from the

arthritic effort, if I may so speak, that the disease is thrown upon the brain, I shall not determine.

Having mentioned the arthritic, we shall here speak of the antinephritic virtues imputed to Bitters, where they are supposed to act as diuretics. As this effect of being diuretic is not considerable, and as they are not supposed to change the figure, &c. of the stones in the kidneys, from analogy we may infer, that their action is much in the same way with some medicines mentioned for the stone. There is a similarity between arthritic and nephritic cases. It is commonly supposed that the nephritic fit is owing to the size, weight, roughness, &c. of the stone in the kidneys. When a person is seized with the Gout, he is relieved from the symptoms ensuing from such supposed causes; though how an inflammation can take off the size, &c. of a stone in the kidneys, is to me impossible to imagine. We must then suppose, that the affection of the kidneys is the cause of concretion of the stone, and not the latter of the former; in the same manner as Gout causes concretions of chalk, so the Gout, from taking off this affection of the kidneys, relieves the symptoms consequent upon it. This will be understood from what we have said on the *Uva Ursi*. I cannot help mentioning a remarkable instance, where the stone in the kidneys remained, and yet the patient was relieved from nephritic complaints by the attack of a gouty paroxysm. A Gentleman, from nephritic complaints was seized with excessive strangury, foetid purulent urine, and ulcers in the whole track of the urinary passages, hectic paroxysms, &c. insomuch that it was thought his case was desperate, when being unexpectedly seized with the Gout, he was relieved from these complaints; his urine became less foetid, freer, &c. and, for a fortnight, during which the Gout lasted, enjoyed an interval of ease from his nephritic pains. Nothing more clearly than this shews the connexion between the *Arthritis* and *Nephritis*.

I knew another person, who being troubled with the Gout, was seized with a *Nephritis*, upon whose encrease the Gout was proportionably

tionably diminished. Upon dissection, no stone was found in the kidneys. This case seems peculiarly to have been adapted to the *Uva Ursi*.

We have commonly been in use to neglect the antinephritic powers of Bitters; yet certainly, although we know their bad effects in the Gout, yet in nephritic cases they may have still enough to be worth enquiring into. Upon the whole, we see the intimate connection between the two diseases, which possibly also may extend to their remedies; and certainly it would be equally ridiculous to reject their power upon the kidney, as to admit of their action on the stone.

Bitters are alledged to have somewhat of a narcotic quality, especially applicable to those which abound in essential oil. So far as it is discovered in Wormwood, it depends on the peculiarity of its essential oil, and not on its Bitterness. Opium is a Bitter, but it would be foolish to say its narcotic qualities depended upon this. I chuse to mention this, as some deduce the bad consequences of Bitters from it.

Bitters are said to weaken the system in general, and particularly the genital powers. Of the truth of this I cannot say. It is scarcely to be known but from a very disagreeable experiment, an experiment on one's-self. More certain am I of another bad effect imputed to them, *viz.* hurting the eyes. Thus, down from the times of the ancients, it has been observed, that Wormwood (and the same property may reside in all) affects, like Sage, the eyes, with an uneasy dryness, weakness, contraction, and inflammation, attended with head-ach. These effects seem to depend on the narcotic quality, as the few which have them abound in essential oil.

PARTICULAR BITTERS.

I have only a few remarks to make upon these; I have distributed them into sets; that containing the first (i) belongs to a natural order, the

SYNGENESIA.

It is in the leaves of these that the Bitterness resides; the root commonly contains an aromatic resin, or, if it contains Bitter, it is of a weaker kind than that of the leaves. What I say upon the leaves does not apply to the *Semiflosculosæ* or *Plano petalæ* which follow. Those we are now treating of are called the *Amara calida*, the following the *Amara frigida*. *Abrotanum fœmina*, I have nothing to observe of it. It is weak in the virtues of its class, and neglected.

The four following are taking notice of as species of the same genus, and therefore as of kindred virtues. Physicians, however, have been chusing, and disputing about that choice. To me, the greatest power of this genus seems to reside in the *Absynthium vulgare*, and there in the leaves. It contains a considerable quantity of essential oil, and is therefore chiefly noted for those narcotic qualities we mentioned, and effects on the eyes. Its smell is rank and disagreeable, but is lost by keeping; that is, evaporation of the volatile part. Dr. Lewis says, that after distilling Wormwood for the simple water, that which remains in the still, after the essential oil is gone, is a pure bitter substance, and gives a considerable impregnation to *alcohol*. I am doubtful whether this practice be right, either in this, or other cases in which Lewis recommends it: At least it remains to be enquired into, whether either the Bitter, or essential oil, when separated, contain the virtues of the entire plant. The *Absynthium* gives foundation for what I said of the root of this class differing from the plant. Though I said *Absynthium* was the strongest of this class, there may be others more strongly aromatic; *e. g.* Haller mentions one which he found in Switzerland, which was used as an universal febrifuge by the inhabitants of the Alps. Of the *Artemisia* we shall speak afterwards.

Carduus benedictus contains a more pure Bitter, and less essential oil, and that very volatile. It may be extracted like Wormwood,
but

but we find that heat applied dissipates it, insomuch that the only agreeable Bitter to be obtained from *Carduus benedictus*, is by infusion in cold water.

The *Carlina* stands in our Dispensatories, but I am not acquainted with it. Authors tell us the root is bitter with acrimony, and considerably active.

Chamæmelum is the most frequently employed, and undoubtedly has almost all the virtues we have been talking of. It abounds in pungent aromatic oil, is considered as the most active of the Bitters, and, before invention of Peruvian Bark, was employed as a substitute for it. I have frequently tried it, and sometimes with effect; but it falls much short of the powers of the Cortex, and, when given in considerable quantity, is much more apt to run off by stool, and disappoint our purpose. Simon Pauli relates, that a strongly impregnated decoction of it in wine, comes at last to acquire a remarkably saline taste, like that of common salt. Neuman confirms the same thing, and finds, that, like common salt, it makes Precipitates, but that they are different from those obtained by it. Believing this might arise from the wine, Neuman boiled that in the same manner by itself, but without obtaining what he got from its impregnation with the Wormwood. *Lewenhoeck, in his Experiments, finds the same sort of crystals, resembling those of common salt in *Carduus benedictus*, but unluckily did not try *Chamæmile*. This preparation ought to be enquired into. It may, perhaps, prove singularly diuretic, as is alledged.

Cotula fætida, or *Wild Chamæmile*. Brown Langrish gives an account of a decoction of this, recommended by a gipsy, throwing a person affected with a Rheumatism, into a profuse sweat, and curing him of the disease. Such instances ought to be marked.

* Vide Philosophical Transactions, No. 173.

Santonicum. This should have been ranked with the Absynthium, of which it is a genus. It is doubtful with regard to the nature of this substance, whether it be a seed at all; but although we see stalks, &c. evidently among it, yet, I think, as evidently we see seeds. As belonging to the Wormwood, I make no doubt of its having virtues, but surely it has none so peculiar as to make us import it. It has been thought anthelmintic, and hence its common name, Wormseed. After many trials, I do not find its effects remarkable. Bitters undoubtedly may destroy worms, but, after many attempts, I have found no success from their use. I blamed the smallness of the dose, but in men, where it was much increased, no better consequences followed.

Tanacetum. From Pringle's Experiments, all our Bitters are Antiseptics. The Tansy has a higher reputation of this kind, and, placed round animal bodies, is said to preserve them long from putrefaction. Tansy has a larger proportion of Aroma, with its Bitter, than any of its class. Its Bitterness is more remarkable in the seed.

The three following substances are well known as medicines. Their virtues reside in an essential oil. In the former, the Oil and Bitter were separable, here the Oil contains both. On this account I consider them as the most acrid and heating, and the bad effects we mentioned as resulting from Bitters, most frequently appear in these.

Essence of Lemons is the most acrid of the three. They have all the common virtues of Bitters. Septalius gives a remarkable preparation of Orange-peel. He takes the *Peel of unripe oranges*, and, by long decoction, treats it as for an extract. This he gave with success in a flow of the menses.

Aurantia Curassavensis. From their peculiar taste, I take these to belong to the *Citrus*, which comprehends the Lemon and Orange. From their bitterness and size, I take them to be an unripe fruit, and therefore

therefore particularly fitted for Septalius's extract, whose effects I design to try; otherwise they seem properly introduced into our Dispensatory, as containing less of an essential oil, and so given with greater safety. Next to the three mentioned, stand

Centaurium minus & *Gentiana*. These, in opposition to the others, contain a pure Bitter, with very little essential oil. They are species of the same genus. Gentian has been long known as a pure Bitter, and, as without odour, is more universally agreeable than any I know. Though not of much value, it has, from the great request in which it is in some countries, been adulterated with a poisonous plant. We seldom find it so here; so that I cannot give you the method of detecting it. As difficult, however, to get properly, Lewis, in the extract of Wormwood, &c. proposes a substitute for it. We wonder he did not rather think of the Lesser Centaury, a plant of the same genus, resembling it in virtues and appearance. If we make choice of this, the leaves should be employed which contain most Bitter, and more as they are nearer the roots. We certainly very improperly use the stalks and flowering tops. In a barren soil this plant is very small. It is inconceivable to think, how much the luxuriance of the plant is improved by transplantation to a fertile soil. Its Bitter also is improved by this change.

At the head of our next list stands *China Chinæ*, the famous

P E R U V I A N B A R K.

Cinchona, Linnæus's name, is the only proper one, for this substance was brought to Europe by the Count of Chincon, after having remarkably cured his Lady; and hence all the other names, *China Chinæ*, &c. are only corruptions. When first introduced, it was found an effectual remedy in Intermittents; but whether it was that a medicine of more seeming efficacy was brought at the same time into Europe, or whether timid practice lessened the dose, it went out

out of credit, and was not, till about thirty years after, restored by Talbot.

This is so much employed, that it would require a particular treatise. We shall not enter so fully upon it, but endeavour to give what is most important of it. Peruvian Bark belongs to the class of Bitters, and along with its Bitterness has an aromatic acrimony, depending on an essential oil present. With this it has a stypticity or astringency, which some have thought proper to deny it; but which is evident sufficiently, when by distillation or solution part of the other qualities are extracted.

All the common qualities of Bitters are ascribed to the Bark. It has the same effects in the stomach and intestines. In a large quantity I have seen it purge; and I have known more than one instance of an habitual Costiveness cured by Peruvian Bark. It was not here given by accident. An habitual Costiveness often proceeds from a weakness in the alimentary canal, and in such case, the Bark, given in the dose of \mathfrak{zj} . for several days together, cured the disease, and seemed to work a considerable change in the system.

Carried into the blood, little notice is taken of the diuretic or diaphoretic powers of the Bark. It is supposed to strengthen the whole of the system. Whether its action here depends on the proper exhibition, or on a specific power, is disputed. The last is commonly supposed, and the manner of operating as difficult, seems altogether neglected at present. I have formerly mentioned my aversion to specifics. Many perhaps we may be still obliged to leave among that number, but surely we ought to endeavour to leave as few as possible.

In order to cure an Intermittent, the Bark must be given in the interval of the paroxysm, and it is universally agreed, that in the fever they are hurtful. Here it acts in preventing the return of the cold fit, and it is pretty generally agreed, that the cold fit is the cause

cause of the disease. Thus Boerhaave, after telling us the order of the fits, tells us, *videtur is, qui primum tempus, & primam causam, superare possit, etiam totum illum paroxysmum posse tollere.*

The prevention of Intermittents depending, then, on the prevention of the cold fit, and the Bark acting on this, its method of action must be explained from the theory we form of the paroxysm of Intermittents. If the cold fit be said to depend on the accumulation of the fluids in the extreme vessels, the Bark alters that accumulation; if on an affection of the moving fibres, the Bark obviates the return of the spasmodic affection. One of these we must take up with. I agree with the last. At this time I will not enter into the discussion of that opinion, or the reasons for assenting to it. On this subject you may consult Van Swieten, Hoffman, &c. I shall give a hint or two upon it.

The paroxysm of Intermittents seems so much an affection of the nervous power, that it is frequently induced and obviated by *animi pathemata*. All periodic affections are either of the spasmodic or feverish kind. I own there may be some difference between these, but, from being the only distinctions, they may be supposed very much of the same nature. That neither *lentor*, nor a putrid *fomes*, as some have alledged, takes place, may be concluded hence, that all periodic affections may become habitual. It is a rule of Celsus, that when a person is cured of an Intermittent, he ought to avoid every thing which would cause a return of the paroxysm, especially on those days in which the fit *used* to return. Now in this case, that person who thus (and it is frequently the case) is apt to have a recurrence of the paroxysm, is commonly in good health, and cannot be supposed to be affected with a putrid *fomes*. It is my opinion, then, that the Bark acts by obviating the spasmodic affection, to which the system is so liable, and accordingly we find it a remarkable remedy in all affections of this kind.

We should wish to go farther, and find this property connected with the sensible qualities of the Bark. The Bark is a Bitter, and

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other

other Bitters have the same effect. I have seen instances, but not frequently, of Bitters curing Intermittents. That Bitters are not so powerful as the Bark, may arise from that being stronger, from their being joined with other qualities, from improper exhibition, or exhibition in too small doses. Thus Chamæmile flowers, supposed by Pitcairn equally specific with the Bark, are much more liable to run off by stool; possibly, if joined with an opiate, that effect might be prevented. The Bark, then, being only a stronger Bitter, we must not confine the property of curing Intermittents to it, but extend it to other Bitters. All this, however, amounts to nothing more than a specific quality of Bitters.

Let us view this matter in another light. Bark is sensibly an Astringent, and other Astringents have been used with success in the same cases; Alum, Steel, and vegetable Astringents. Galls, in France, by Renaud and Homberg, were found a remedy in Intermittents. The Academy ordered Lemery, Geoffroy, and other Members, to make trial of it, and their report was, that Galls did cure Intermittents, though not so constantly as the Bark. Bark, then, as an Astringent, may only be of a stronger nature, since proof remains of pure Astringents acting in the same way. Farther, it does not appear, from experiments mentioned, how much may be the effect of pure Astringents; for Renaud only gave the medicine in a small dose; for in the exhibition of Astringents we are ever in fear of exceeding in quantity; and it has been objected to the Bark, supposing it an Astringent, that by its exhibition in the quantity given, we should be in danger of suppressing healthy evacuations. It is possible, then, that had the Galls been given in sufficient dose, they had much oftner effected a cure. Others, who are of a different opinion, allow the Astringents may cure Intermittents, but that that is very seldom, and that it is absolutely necessary Bitters should be joined with Astringency. Hence it is, that in Germany they use Trifoil and Tormentil joined, and with success.

As Astringents, in many other cases, are antispasmodic, it is highly probable that the action of the Bark is nearly of the same kind.

Whether

Whether in any sense it is antispasmodic, in the common acceptation of the word, I shall not determine. Its operation may be explained in this manner.

I have formerly told you what I meant by Tone of the fibres. Tonic medicines are such as give this tone to the fibres, opposed on the one hand to rigidity, and on the other to laxity. That such a tone takes place in the whole fibres of the human body, especially in the blood vessels, where some have doubted it, appears to me sufficiently evident. This tone depends on the firmness of cohesion of the simple solids, and on the influx of the nervous power. The first being commonly given, it is plain tone must depend chiefly on the last. Now although it be doubted of the muscular fibres of the blood-vessels, yet as they are of the same nervous origin, they are therefore depending, for their tone, on a certain influx of the nervous power. Nothing is more common than to see mobility depending on *atonia*, as Hoffman terms it. By encreasing the tone of our fibres, does the Bark seem to act in obviating the return of spasmodic affections. All this will be confirmed by attending to the history of Intermittents, and the proper exhibition of the Bark in them.

In their paroxysm it is pretty evident, that amidst those spasmodic motions which occur, there is always a constriction in the surface of the body. Our tonic medicine encreases that constriction, and therefore ought not to be exhibited in the hot fit where that takes place.

That Constriction, especially at the beginning of the disease, not only remains through the whole fit, but also in the interval, and therefore it is necessary to allow the disease to go on, through several paroxysms, till by repeated sweats the constriction is removed. Hence the caution of practitioners, not to give the Bark till after the disease has had a few returns.

In proof of Constriction taking place in the extreme vessels, the blood, during the paroxysm, is collected in the viscera or abdomen.

Till this determination, therefore, be taken off, and the balance restored to the surface, it is imprudent to exhibit the Bark. Hence we premise Emetics, to determine to the surface and take off obstructions, in the abdominal viscera. When the Bark is exhibited, it must be joined with purgatives, to obviate the astringency in the *primæ viæ*, and the obstructions we have mentioned. When these are removed, we must observe, that the purgative effect of the Bark itself, or the exhibition of other purgatives along with it, will disappoint our intention. The reason is this: It is found, that every debilitating power applied to the body, such as evacuations, cooling medicines, &c. favour the return of Intermittents. Hence, then, the evacuation produced, either by the Bark itself, or other substances, does more than compensate by its weakening effects, the power of the Bark, in strengthening the tone of the fibres. Sometimes, however, effects may be mixed, and the Bark answer where a purging ensues. Here, although the chief operation of the Bark be on the stomach, yet a part of it may be carried into the blood, and obviate, compensate, or overpower the effects of the purging.

Wherever an inflammatory diathesis obtains in the system, wherever the *vis tonica* is increased, there the Bark is hurtful. In the blood vessels this increase of the *vis tonica* appears from the tension of the pulse. Hence it is the Bark is not near so effectual in vernal, as in summer or autumnal agues.

On the contrary, wherever a putrid diathesis prevails, there the *vis tonica* is diminished below the standard, and there universally the Bark is useful. I am very ready to allow, with Dr. Pringle, that a putrescency accompanies Autumnal Intermittents, and that the Bark is noted for its antiseptic quality. But the small quantity given, and still more, the very small quantity extracted, and the little that must be absorbed of that quantity extracted, to me would seem to have very little effect in preventing the putrescency of the fluids. Much more do I imagine (and Dr. Pringle consents to it, and enumerates other Astringents which have the same property) that the Bark, in
such

such cases, acts by restoring tone to the fibres, debilitated by putrefaction.

Hence not only in Autumnal Intermittents, but in all putrid Fevers and in putrid diathesis of all kinds; in all remittent Fevers, where the remission is evident, and in anomalous or malignant Fevers, where a putrefaction takes place, the Bark is used with advantage. With regard to continued Fevers, there also the Bark is employed; but with more dispute than in the former cases, and without any persons, as far as I know, having ascertained the state of continued Fevers in which it should be exhibited. Continued Fevers are not what the antients called *Febres continentes*, viz. such as after the cold fit had a hot fit following it, and continued during the whole course, till the Fever was terminated by a crisis. There is a distinction betwixt the *Febres continentes* and *continuae*; for in the last they acknowledged an intermission to occur. In my practice I have never been able to see a continent Fever, and I find, from the accounts of the antients, that they confirm me in this. Hence I would alledge, that every Fever whatever consists of the return of a repeated number of paroxysms. If this be the case, and as the return of the paroxysms depends on that of the cold fit, it is plain that by obviating the return of spasmodic accession, the Bark may be as useful in continued, as in intermittent Fevers. But the difficulties attending the exhibition of the Bark in Intermittents, are much greater here. *There*, as the Bark can neither be given in the cold nor hot fits, nor sometimes even in the interval, when the constriction on the surface is not removed, it is plain that *here* the exhibition will be more dubious, where the effects of the hot fit will be more continued. Wherever an inflammatory diathesis and encreased *vis tonica* are present, we must certainly avoid the Bark; and in the continued Fever, it is very difficult to ascertain the times of accession or remission, another obstacle to its use. *If a distinct remission appear, we may exhibit the Bark with confidence and success.* No body better illustrates this than Cleghorn. When the Bark was not given at the intermission, his patients died. He watched the time of intermission,

termiffion, and, given then, found the Bark fucceed in cafes termed desperate. If any body would ftudy this fubject farther, he muft confult Dr. Morton, a writer who abounds as much in practical facts and obfervations as any, but, as falling into a fystem of theory very different from the fimple fagacity of Sydenham, too much neglected. He constantly ufed the Bark in continued Fevers with the cautions mentioned. One cafe, however, of continued Fever (whatever ambiguity may remain as to the reft) there is, where the Bark may be employed without regard to intermiffion, *viz.* wherever a putrid diathefis has gone to a great length in the fystem. I would alledge this often takes place where the difeafe is very inflammatory in the beginning. Wherever *maculae*, *petechiae*, &c. appear, there, I think, the Bark may be univerfally employed. A difpute is carried on between De Haen and Pringle about the nature of *petechiae*. From the experiments of the latter it appears, that in all fuch cafes the Bark is the remedy chiefly to be trusted. De Haen, in his *Ratio medendi*, gives many instances of putrid Fevers cured by this remedy; and other writers, who have ufed the Bark in thefe Fevers, give fimilar instances of its good effect. For the ufe of the Bark in Fevers, befide the authors above-mentioned, you fhould carefully confult Francifcus Torti, in his *Therapeutice fpecialis*, and Warhoff, *De Febrib.* edit. 1745.

In Dyfentery the Bark is not fo frequently employed as in fome of the foregoing cafes, but ftill fo often as to convince us of its utility. I confider Dyfentery as a febrile difeafe, and every body knows, that it is founded in, or caufes a putrid Diathefis. This difeafe in the beginning is often inflammatory, and then the Bark is improper. Such inflammatory Dyfenteries, by continuance, often grow putrid, and in all fuch, as well as the originally putrid, the Bark is of great efficacy. In one of thefe cafes, if given in fufficient quantity, the action of the Bark may be confidered as antifeptic to the fluids in the *primæ viæ*; but in a more advanced Dyfentery it muft act chiefly as astringent. We have had much delicacy in the ufe of Astringents in the Dyfentery, but, in general,
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we should succeed much better, did we exhibit them more frequently, and more early than we do. Dysentery, as Sydenham terms it, may be considered as a *Febris introversa*, with constriction of the skin. Now the Bark, as a tonic medicine, may not only be more safely applied than simple Astringents, but will likewise act in restoring the equilibrium to the surface. Several writers have taken notice of the use of the Bark in Dysentery; you may consult a treatise by Wilson at Newcastle.

Bark is also employed in Gangrene and Mortification. Its efficacy is now sufficiently established by universal consent. If any doubt remain of its virtue here, where the ill success has not arisen from mismanagement, it may, perhaps, be thus explained. There are properly two kinds of Gangrene; the one kind arising from the violence of inflammation purely, the other from a flaccidity of the vessels of the part, or, at the same time, an *atonia* of the whole system. Every body knows the first; the last is what occurs in hydropic, paralytic, or old people. It is in the last, that the Bark seems peculiarly appropriated, and very seldom, in these cases, if given in a proper dose, does it fail to bring on a suppuratory inflammation, and separate the mortified part. In purely inflammatory Gangrenes, if it has not been successful, it is from improper exhibition, and the reason is obviously this, that the Bark, acting by giving tone to the moving fibres, must certainly be hurtful where that is so much encreased by disease.

We have attempted to cure Fevers by a variety of Stimuli, in order to excite such a degree of Fever, as might obviate the degree of accession. But the Peruvian Bark does not operate by its aroma; for the pulse by it is not encreased above its healthy standard; and although it takes off flaccidity, yet it does not irritate the heart and vessels. It is necessary to observe this, in order to talk of the cause of the cure of suppuration. Where suppuration is wanting, it depends very often on the flaccidity of the part. In this case, it is brought on by Stimulants applied to the part. It is in this manner

manner that I think all the balsamic substances act, and likewise Copper and Mercury, *viz.* in restoring the tone of the flaccid fibres. In the same way, in stagnating, sanious, and ichorous Ulcers, the Bark mends the suppuration, and brings on a kindly healing of the sore.

Not long ago the Bark has been said to cure Cancers, but in all of these its effects are not remarkable; and we are here liable to be deceived, as very often where there is an Ulcer *mali moris*, it is apt to be confounded with a Cancer. But even in Cancers I have seen its good effects, and the matter mended by its use; and Ulcers *peffimi moris* I have seen cured by it. In short, wherever a suppuration is to be carried on, not in its own nature inflammatory, and wherever, in such cases, there is a tendency to the sinking of the *vis vitæ*, the Bark is useful. Hence, successfully it has been exhibited in the Small Pox, which I consider merely as a suppuratory disease. Wherever the Small Pox are attended with an inflammation round the pustules, and that inflammation extends to the rest of the system, the Bark may be pernicious, and is certainly hurtful; whereas at those times where a putrid diathesis is more evident, and the topical inflammation does not appear, it has been as remarkably useful in bringing on a proper suppuration. If any doubt remain of its efficacy in the Small Pox, it is from its promiscuous use. You see it ought properly to be confined to the suppuratory state, and, in general, ought not to be given till the fifth or sixth day. I know it has been used in the eruptive Fever, but I imagine with bad consequences; for where there is an inflammatory state over the whole body, it must certainly do mischief. This last rule is without exception, except in Small Pox of a singular kind, where, from the very beginning, they appear with *petechiæ*. As to the secondary Fever of the Small Pox, its use there is more doubtful: This I know, that very often, (and it is commonly the case,) that Fever is inflammatory, and much better cured by blood-letting and purging, than any other means, and rendered worse by the use of the Bark; for by the eruptive
Fever

Fever the body is left in an inflammatory state. In the Measles this is very remarkable, and also occurs in the Small Pox, and I take it, that wherever an evacuation is to be carried on, the Bark is inconsistent, superfluous, or hurtful, and then only useful where a putrid diathesis is very evident in the first part of a secondary Fever, or apt to occur in its continuance.

As efficacious in Ulcers and in the Small Pox, some have thought of extending the use of the Bark to internal Ulcers, and have used it in the *phthisis pulmonalis*. Physicians now see that its bad effects are evident, and almost inevitable in this case. The reason is, that the *phthisis pulmonalis* is accompanied with an inflammatory state. A practice, about thirty years ago, was proposed by Dr. Dover, of curing Consumptions by frequent and small bleedings, and I myself have seen a phthical person bled to the fiftieth time, and I never saw the blood drawn in such cases without that crust which is the sign of inflammation. Very often the case is purely inflammatory, and almost always partly so.

These are the principal uses of the Bark, in which I have endeavoured to explain its operation. Some special cases yet remain. The Bark has been employed in scrophulous cases. The Scrophula is attended with Ulcers *malæ moris*, depending on a flaccidity of the vessels of the part, and of the system in general very often; so that here the Bark is plainly indicated, and I make no doubt of the success had by Doctors Fothergill and Fordyce in such circumstances. But it must be observed, that the Bark very often fails in this disease. But even these Gentlemen have not always succeeded, because I imagine this disease is often not to be cured certainly by any medicine; for it seems often a disease of the lymph, seated in the lymphatic vessels, and not depending so much on a general flaccidity of the system in general, as in some peculiar affection of the lymphatics, and matter generated there.

More successfully has the Bark been given, as a remedy of spasmodic affections, in the hypochondriac and hysteric disease,

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and in certain kinds of Asthma; but here not with such success as to be reckoned a specific. Wherever disease depends on a mobility, and that on a debility, and wherever these are causes or effects of disease, and not complicated with obstructions formed, there the Bark may be safely and successfully employed. In the hypochondriac disease, then, where the viscera yet remain entire, we may have recourse to the Bark; but in the decline of life, when the disease is properly hypochondriac, and where there are considerable obstructions in the viscera, there it must manifestly do prejudice. On the contrary, in the pure hysteric disease, without labes of the viscera, depending on causes acting on too moveable constitutions, passions of the mind, &c. the Bark is very proper, and should always be used. Epilepsy often depends on similar mobility, and here also it must be useful; but where that disease depends on a wrong conformation of the brain, little service can be expected from the Bark. Sir John Floyer found the spasmodic Asthma, and the hysteric, without labes of the lungs, pretty certainly relieved by the Bark, but wherever the lungs are over-loaded, and expectoration is necessary, there it is found hurtful.

In the *Chorea Sancti Viti*, or those complicated, irregular, spasmodic motions, which occur in persons of a lax moveable constitution, the Bark is a remedy to be depended on. Sydenham proposes this disease to be treated by evacuations, and in the beginning, where there is a fulness, they may certainly be necessary; but by their continuance, I have never seen the disease cured; while the Bark prevailed, after an unsuccessful trial of them.

The Bark has been proposed in the case of menstrual obstructions. These are of various kinds. One species, which occurs at the first attack of the menses, viz. the *Chlorosis*, seems, when we take a view of it, to be attended with all the symptoms of flaccidity and want of tone, and for this reason is commonly treated with Steel, and wherever that remedy succeeds, there have I seen the Bark exhibited with equal advantage. Menstrual obstructions, however, may arise from causes acting particularly on the uterus, and not on
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the system in general, and there neither Bark nor Chalybeates should be given. It is not very common to employ Bark in *Chlorosis*, or obstructed menses.

Much more commonly is the Bark exhibited in the *fluxu nimio mensium*. Here, too, Astringents and Chalybeates are employed, and given in such quantity as to bring on strong astringent. Whether the Bark answers equally well as an Astringent with the preparations of Iron, I shall not say. Wherever the profusion depends on irritability and flaccidity, there I employ the Bark joined with *Sal martis*.

It has been a question, whether the Bark may be employed in other Hæmorrhages? I think we may answer in the negative, generally. In cases of Hæmorrhage that depend on mobility and debility, the Bark may be used with advantage; and in those by long subsistence become habitual and periodical. But Hæmorrhages strictly considered, and those by unusual outlets, are constantly of the inflammatory kind. Thus Hæmoptoë, in nine of ten cases, depends on an inflammatory diathesis. There may, however, be cases of Hæmoptoë, which have long subsisted, and are kept up by laxity, where both the Bark and Astringents may do service. These it is very difficult to discern, and where the inflammatory are mistaken for them, bad consequences will follow.

In Dr. Haller's collection of Dissertations, there is one on the use of the Bark in Jaundice. I will not absolutely deny the use of the Bark in this case. We might say, that other Astringents have been used for the same purpose. But now we know that Jaundice very often depends on stones in the biliary ducts, which pass slowly through; so that the medicine given at the time of their falling out, &c. has imputed to it the virtue of curing the disease. It is not easy to see how medicines of this kind should promote the passage of such stones, and at any rate, from the Author of the Dissertation, we cannot be certain of the

effects of the Bark. He seems unacquainted with the possibility of the accidents above-mentioned, and joins with the Bark * a farrago of other medicines, some of which, perhaps, are more adapted to the cure of the disease.

There is another disease, in which the Bark is employed, *viz.* Chin-cough. I have had frequent experience of the use of the Bark here. The efficacy of the Bark here shews the disease of the spasmodic kind, or, the spasmodic nature of the disease being given, shews the reasonableness of using the Bark in it. Wherever a child can be made to take the Bark in sufficient quantity, by the mouth, it is almost a certain cure for the Chin-cough; and even by injection, though not so constantly, it succeeds. As to the time of exhibition, when the disease is recent, and there are symptoms of an infarction in the lungs, while yet no solution of the spasm appears, nor expectoration takes place, I imagine the exhibition of the Bark is dangerous, and bleeding and emetics must be premised. Often in the Chin-cough a bleeding at the nose and vomiting ensue, both which are favourable symptoms, and therefore before a bleeding at the nose or vomiting ensue, if there be not a certainty of no infarction in the lungs, I never gave the Bark; but after these I always exhibit it with success. I have had in the exhibition of this remedy in the Chin-cough little regard to the Fever, except in the beginning, always giving it where the disease has been drawn out to a great length. The only caution to be regarded is this, *viz.* to avoid giving it in the evening hours, where an exacerbation of the Fever ensues, and rather to exhibit it in the morning and forenoon, stopping before the mid-day accession.

I have only to add one more practical direction, which I had not an opportunity of mentioning. I mentioned how apt Intermittents were to return, from habit. This leads us to give the Bark in considerable quantity. The Bark has been said not to cure Quartans. In these the tendency to continue is very great, and a large

* Besides, he gives the Bark in too small quantity to produce any effect.

proportion of Bark is necessary ; nor, indeed, ought it to be limited to any quantity, but given in as great as the stomach can bear. There are instances of persons taking \mathfrak{zj} . without bad consequences ; and I myself have seen \mathfrak{zss} . exhibited with great safety. In general, the bad effects of the Bark depend on exhibiting it in improper cases, seldom on the quantity given. We are often straitened with regard to the interval of the Bark ; but here, as in the Quotidian Ague, we ought never to exhibit it, but between the paroxysms. Some are so nice, that although the paroxysm does not appear, yet they stop the exhibition of the Bark, till the time in which the interval should again appear. But I find, that if the paroxysm is stopped, and no sense of the pain in the nails, languor, &c. take place, we may continue with safety ; and by this method have I cured Agues which would not yield in the other way.

It has been objected to the use of the Bark, that Intermittents are apt to return, that there is no end of pouring in the Bark, and that the system will be destroyed by it. But I am persuaded, that this is owing to not continuing the Bark in sufficient quantity ; for though the paroxysm disappears for a short time, yet the tendency still remaining, it soon gains strength and recurs. We ought to proceed in this manner. After the disease is removed, we should return to the use of the Bark in three or four days ; after that in the interval of a week, then a fortnight, and so on, if I may so call it, during the epidemic season.

As to the pharmaceutical treatment of the Bark, it ought always to be exhibited in large quantities, and in substance ; for the powers of the stomach seem much greater upon it than those of any menstruum out of the body. With some reason it has been imagined, that the action of the Bark is upon the stomach. Hence it has been said, that all fluid preparations of it pass off by the pylorus, and for that reason do not answer so well as the simple Bark, which remains much longer. This reasoning is ingenious, but we may be satisfied with what was alledged of the smallness of
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of the quantity extracted. With regard to the extraction, long boiling destroys its virtues. Ten grains of the Extract has been said to be equal to 5fs. of the Bark in powder; but in practice I find that equal quantities are necessary, and considering the long coction destroys the texture, as much as it enlarges the quantity extracted, it is no wonder that it is so. As spirits disagree with many, wherever extraction is necessary, we must employ water; and infusion with water is preferable to decoction, being equally strong and preserving the aroma. By gentle heat we may evaporate the infusion to any quantity.

ACORUS VERUS, or CALAM. AROMATICUS.

The place of this is uncertain; whether it ought to be placed among the *Aroma* here, or among the Bitters, whose qualities it also possesses. As not remarkable for any of these virtues, it has been, of late, neglected. I have placed it next the Bark, as it has been frequently employed for the same purposes. Upon good authority, I found it had cured Intermittent Fevers. I myself had it tried, and found it alone to do so. How far it is to be depended upon in ordinary cases, farther experience must determine. It is much of the same nature with the Bark, aromatic, bitter, and astringent, pretty evidently, but contains more essential oil. Like the Bark, it must be given in large doses, and in substance. Haller gives it in ʒij. The stomach bears better a large dose of it, than of the Bark.

The three next plants belong to the *Verticillatæ*, and might have been mentioned with the *Scordium*, &c.

Chamaepitys. This, with the Chamedrys, Gentian, and Centaury, enters into the Portland Powder, formerly mentioned. Its acrimony is of the terebinthinate kind, and hence called in England Ground-pine. To shew the analogy of these plants, Shaw tells us, that in Barbary the *Chamaepitys* is used with success in Intermittents. As to the

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Marrubium, it is the strongest Bitter of the class, and frequently employed for the uses of other Bitters. Its use is not properly defined. I cannot agree with *Materia Medica* writers, who constantly make it pectoral. It is not supported by analogy. Few of the *Verticillatæ* are pectoral, and many more of them are bitter, without any antispasmodic quality. There is nothing in which we are more apt frequently to be misled, than in supposing acrid medicines to act as pectoral.

Dieltamnus albus. This is a strong, simple, and pure Bitter. I have had no account of it. The root of it is used. Many plants have a strong odour exhaling from them, which I imagine is their essential oil. *Dieltamnus albus* is the only one which will shew the inflammability of this vapour, which in it will take fire, on the application of a candle. Next to these three stands the

L U P U L U S, H O P S.

This is a pretty strong Bitter, with a slight aroma. In Spain, from good authority, I know it is used as a Sudorific, to banish the remains of the Venereal Disease. Like other Bitters, it prevents fermentation and acidity in vinous liquors; hence it is used as a condiment to ales. Whether there is any thing peculiar in Hops, is very uncertain. Before the introduction of these, other Bitters were used for the same purpose, and poverty obliges some to use these still, and from experiments I have found them equally effectual. With regard to gratefulness, experiments must be repeated with different quantities. Much has been said of the effects of Ale or Beer, in calculous cases; but I imagine they can have little effect, either in generating or removing *calculi*. We have reason to think, that these depend on peculiarities of constitution and habit, not easily removed by diet of any kind.

LECTURES ON THE TRIFOLIUM PALUSTRE.

Both the leaves and roots of this afford a strong Bitter, without any aromatic acrimony, approaching in sensible qualities to the Gentian and Centaury, but more harsh and disagreeable. It is applied to all the purposes of Bitters, and has been celebrated as an Antiscorbutic. There is no doubt but all Bitters, as antiseptic with regard to the fluids, and tonic and constringent with respect to the solids, may be employed with success in Scurvy, though not by themselves, but accompanied with acescent aliment. With regard to Trefoil, I do not say its virtues are great in this respect. I imagine it very doubtful whether it is properly or not given by the Germans.

This finishes the *Amara calida*. We shall now make a few observations on their

PHARMACEUTICAL TREATMENT.

Pretty universally they are more agreeable in their dry state than in their recent. Most of them contain an oil, of which a portion is more volatile than the rest, and gives a rank, disagreeable odour to the subject, and, which I imagine is not without foundation, thought of a narcotic, inebriating quality. This odour is lost by drying, and even the mildest Bitters, *e. g.* Centaury, have some of it. When any considerable efficacy is to be expected from their use, they should be exhibited in substance, both on account of the difficulty, except they are in a very tender herbaceous state, of extracting them perfectly, and perhaps also from its being necessary they should be detained some time in the stomach. Another obstacle is, that in their recent or dissolved state, they are much more apt to run off by stool than when dry. Their Bitterness does not reside in an essential oil to be raised by distillation, but in a more fixed, partly gummy, and partly resinous substance, and therefore to be extracted both by water and alcohol; by water a greater quantity, by spirit a stronger, purer, and more elegant Bitter being extracted, which
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leads us to think that it chiefly resides in a resin. The more heat is applied in the extraction, the Bitter will be more disagreeable, and by boiling, the whole of the essential oil will be dissipated. It is true the more pure Bitter still remains; but I think it very doubtful whether also some virtue does not depend on the Aroma, united with the Bitter. In extracting these Bitters we want to shun their disagreeableness. Spirit, without destroying the quality, renders the Bitter more agreeable; water renders it more harsh, and wine, though rather a watery than a spirituous menstruum, yet here corrects the Bitterness; but whether without changing the virtue is not certain. All the fossil acids, in a very small quantity, destroy Bitters. Perhaps it is from the acid in wine, acting in this manner, that it mitigates the nauseous taste of the Bitter. For my part, I think it very doubtful, whether acids are well employed in extracting acid substances. The very strong Squill may still retain its properties, but this will scarcely apply to others. Alkali, too, is sometimes added, but contributes nothing to the extraction; for the same colour, &c. is procured by adding alkali to the common solution after it is made, as before. It does not, however, impair the qualities, and therefore is very properly added as a diuretic to our Bitters.

AMARA FRIGIDA.

These, on a wrong foundation, have been supposed of a cooling virtue. The mistake has probably arisen from the method of our using them at table, young and blanched, and then containing only a mild vegetable juice.

The four first belong to the subdivision of the *Syngenesia*, the *Semiflosculosæ*. This order are all lactescent and acrid, and commonly containing an oily matter, which when dried is inflammable. They are all supposed of a poisonous nature. These here are the only exceptions, with some of the campanaceous tribe of plants, containing a milky juice, and not being poisonous. Even here their quality is suspected, and some of them, as the *Lactuca*, is reported to have a

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strong narcotic virtue; and therefore, although these four were set down as a specimen of the whole, the analogy must be transferred, with very great caution, to the rest of the tribe. Even the esculent Lettuce, by Galen, is maintained to be of a poisonous nature. This was probably owing to the heat of the climate, but it shows the tendency of such plants. Besides the milky juice, these plants contain an essential salt, in which the cooling quality is supposed to reside; but it cannot be extracted in such quantity as to shew that effect. As to their medicinal qualities, they have the common virtues of Bitters. *Materia Medica* writers constantly talk of their aperient qualities, and imagine them almost specific in visceral obstructions. In confirmation of this they prove purgative, and in that manner may be useful to the hypochondriacs. Boerhaave has a particular affection to the *Amara frigida*, and supposes they have a power of dissolving the *atrabilis* he thinks present, and of washing off impurities from the blood. I have employed the juice of the *Dens leonis* in the quantity of ℥iv. but neither observed its laxative nor diuretic power. Boerhaave talks of their saponaceous quality very much, but without any precision; for whenever we lose sight of a combination of alkali and oil, and talk of a sapo composed of any saline or inflammable substance, we can convey nothing distinct to the reader, nor accurate as to what virtue we mean the substance exerts. I deny such soapy qualities, and with regard to the *Amara frigida*, their use in medicine is not yet ascertained. After these is inserted

F U M A R I A,

Not from its being a-kin in natural order, but because it resembles those we have mentioned in sensible qualities, in which Sir John Floyer talks of a smoaky footy taste. It matters not whether the term is precise, since the *Fumaria* and the former certainly agree in taste, and in the same ascribed virtues. To me it is more purgative, and therefore more fitted to the Hectics and Hypochondriacs. Opposite to / stands the term

A C R I A.

A C R I A.

By this I mean such plants as are simply acrid, without any Aroma or Bitterness joined. If I were again to make up the list of Stimulants, I should transfer many of them to the class of Evacuants, as Diuretics, &c. but this is an error of no great consequence.

A R U M.

This is very acrid in its recent state, but inert when dried; inso-much as sometimes to be employed in food. It stimulates the stomach, and promotes appetite and digestion; stimulates the intestines, which, by its effects, if given in quantity sufficient, it will discover; is remarkable for stimulating the kidneys, and like most other substances, which do so in the mucous glands of the *Bronchiæ*. Hence we see it is a-kin to the Squills, but more pungent and volatile. It is much out of practice at present, and for a very good reason, because it is very difficult to procure in a proper state; for when recent, it will not powder, and when we attempt to dry it, we are apt to go too far.

E U P H O R B I U M.

It is an acrid Stimulant, used only externally. As exerting an attrahent virtue, it shall be considered in another place. It might have been transferred to the Purgatives.

I M P E R A T O R I A,

Belongs to the *Umbellatæ*. The part employed is the root. It is more acrid than the former *Umbellatæ* enumerated. Since I spoke of these, I have examined the root of *Angelica*, and find it equally acrid with the *Imperatoria*, and therefore suspicious.

I R I S N O S T R A S.

This term implies ambiguity. So far as we can perceive, the whole genus of the *Iris* is remarkably acrid, both the flowers and

LECTURES ON THE

roots. It is a great mistake to give the *Iris palustris lutea* the qualities of astringent, and recommending it as such. It is equally acrid with the *Iris* in our Dispensatory. The *Iris Florentina* is acrid, too, in its recent state. I take the virtues of all of them to be the same as those of the *Iris lutea* in their recent state, viz. that of a very strong Errhine when snuffed, as I have seen it not only causing sneezing, but inflammation of the nose and head. Internally it is a strong cathartic, and answers as a Hydragogue. In the Medical Essays you may see it employed in one case: I have seen it in several others. The dose is set too high, viz. ʒij. Two drachms is farther than I would chuse to go. Even fifty drops of the juice will prove purgative. In exhibiting it we should begin with small quantities at first.

PERSICARIA URENS

Is an example of the difference in substances, connected by botanical analogy. It is remarkable for acrimony, although the rest of its genus are mild. Its acrimony operates chiefly on the kidneys, and it proves diuretic. I have had no experience of it. What is remarkable, it gives out its diuretic virtues, in distillation, to water, which ought to be tried on other substances besides the *Persicaria*.

PYRETHRUM

Is an acrid, which resides in the leaves and in many of the roots of its order. It is employed as a masticatory in the Tooth-ach. It belongs to the *Composita*.

SEDUM MINUS ACRE.

Another instance of different virtues in plants of the same genus. Its qualities approach to those of the *Siliculosæ*. It has been employed as emetic, and its effects may go farther in the system. The seeds are of a strong acrimony, and confined entirely to external use, in destroying some vermin which infect the body.

WINE.

WINE.

We have here no perfectly pure Wines. As most of those we employ are the produce of foreign countries, either before or after importation, they fall into the hands of the trader, where such additions are made to them, were they pure of themselves, as would contaminate that purity. But as all Wine is prepared from a saccharine juice, which undergoes fermentation, and as the whole is not converted at once, but changed only successively, one part will remain unassimilated, while another has gone a further step, and become vinegar. And thus in all Wine we have these three parts, *viz.* 1st, A quantity of unassimilated Must; 2dly, A vinous liquor; and, 3dly, A quantity of vinegar. We shall first mention the properties of the several parts of Wines by themselves, and then talk of the properties of these separate parts combined.

Every Wine consists, more or less, of these three parts: *Must*, *pure Wine*, and *Vinegar*; for it is almost impossible, either to have fruit so matured, or so to conduct the fermentation, but a portion of each of these must appear.

I. M U S T.

Sugar alone ferments in the stomach, gives out a *gas sylvestre*, acts on the bile, has a laxative property, &c. Whether the Sugar diffused in *Must*, owing to its mixture with the native juice of vegetables, may have these effects varied, I shall not say. Certain it is, that *Must* acts in a less quantity than Sugar. *Must* may be considered as causing in the stomach fermentation or acidity. Its effects, then, are of two kinds; 1. of the *gas sylvestre* generated on the nerves. In so far as that is generated from the fermentation of *Must* in the stomach, it will destroy the tone of the stomach, dispose it to spasmodic contractions, and consequently disturb and interrupt the course of digestion. 2. If acidity is produced, it will
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join with the *gas sylvestre* in weakening the stomach; the acid thus formed will unite with the bile, produce a strong stimulus, thus occasion a flow of more bile to the intestines, and cause a *Cholera morbus*, with violent spasms, and copious evacuations upwards and downwards. Although these consequences of the *Must* may go thus far, yet they are commonly more mild.

2. W I N E.

The distinguishing property of that part of the *Must* which is converted into Wine, is, that it now contains an Alcohol, at least it is that on which the chief effects of the pure vinous part, which I said was in Wine, depends. On this head, therefore, we must consider the effects of Alcohol. 1. Alcohol applied to the fluids, coagulates them; 2. to the solids, constricts and hardens them; and hence, in stopping Hæmorrhages, may act in either way. Applied either to the fluids suddenly, or injected into the vessels of living animals, in small quantity, it will produce death. 3. In the stomach, its chemical effects on the fluids and solids may almost be neglected; nor can we suppose, with Boerhaave, that, carried thence into the vessels of animals, it can be subject to those vicissitudes of heat and cold, producing condensation and rarefaction, and thus unequal compressions, and thence diseases. Alcohol diluted, loses that strong power to generate heat; it must also lose its coagulating powers, diluted in the blood vessels. Alcohol, internally, acts on the nervous system purely, chiefly by means of the stomach. In small doses it simply stimulates, increases the action of the heart and vessels, increases the nervous flow over the whole of the system, whence more serenity and ease of mind, more clearness and liveliness of imagination, and the vigorous exertion of every faculty. In large doses it has a contrary effect; it destroys the mobility of the nervous power, in interrupting its flow from the *Sensorium commune*; whence from its sedative and stimulant effects mixed, it produces confusion of ideas and delirium; if the doses are still repeated, the nervous flow is arrested, the voluntary and involuntary motions are destroyed, sleep

sleep produced, lethargy, apoplexy, death. These are the effects of the Alcohol of Wines. In Wines themselves, especially in the last stage, the effects are almost never so violent, for the Wine is necessarily thrown in more dilute at first, and in smaller doses, and has, in a manner, the consequence of one dose dissipated, before another is repeated, and therefore is more stimulant, and raises the spirits more. It does produce stupor, but seldom death; for besides it being more dilute, from its stimulant qualities it is apt to be thrown up from the stomach, and again has, by the other matters in it, the powers of the Alcohol moderated. Whether the *Must*, *Acid*, and *Alcohol* are all in every Wine, I shall not determine. Certain it is, that if any body were to drink of pure Alcohol as much as they can drink of Wine, in proportion to the strength it would have deleterious effects. Alcohol is more inflammatory too, and productive of an inflammatory diathesis, than Wine, because of the acid, &c. accompanying the latter. A proof of this is, that Punch, which is an artificial Wine, is less noxious than the same quantity of diluted Alcohol. Something also depends on the accuracy of mixture, for Punch, though less noxious than Alcohol, is more so than Wine. Hence I imagine it is a very bad practice to mix Alcohol with fermented Wines; for though it is better than Punch, and by very long digestion may be possibly mixed accurately with the Wine, yet it is far less safe than the same quantity of spirit, gained by the vinous liquors themselves, during their fermentation.

3. A C I D.

The Acid¹⁾ of Wines may be considered as of two kinds; 1. That Acid, which, during the whole progress of fermentation, is manifestly evolved, and which probably enters into the composition of Wine and Alcohol; 2. That which is generated, from part of the vinous liquor going on to the acetous process more copiously and more separate, then called Vinegar. This renders the Wine more grateful to the palate, stimulates the mucous glands, and quenches thirst; and in the stomach, by obviating putrefaction, exerts somewhat of the same quality. Vinegar may always be considered as a
mixed

mixed body, at least on most occasions, containing, besides the Acid, a part of unconverted, saccharine matter. As containing such, it may be laxative in the intestines, have the effect of unconverted *Must*, generate *gas sylvestre* in the intestines, and, in short, have all the properties of fresh juice. When thoroughly converted, it acts in another manner. By the quantity of Acid, it determines other vegetables to acescency, weakening the stomach, and, therefore, hurtful to such as have their health very much depending on the tone of that organ in arthritic and hypochondriac cases. This cooling quality in Vinegar may go so far as to imitate the effects of the *gas sylvestre*, prove spasmodic, and have all the consequences of Acid, generated in the stomach itself.

In so far as Wine contains Vinegar, or *Must*, it is not perfect; but it is unavoidable but that in every Wine we have, they should be more or less present. In the combined state of these qualities in Wine, they are much more innocent than we have described them as separate; the Alcohol and Vinegar obviate the fermentation of the *Must*, the stimulant of the Alcohol obviates the cooling quality of the Vinegar, and this again, with the *Must*, the inflammatory consequences of the Alcohol. There is in Wine a fourth ingredient, viz. Water, which, according to its proportion, moderates the other qualities.

In many countries weak Wine is used as common drink, without any bad consequences. For my part, I imagine it has considerable advantages, tending to obviate the acescency of vegetable aliment, as we see in strong Wines, taken with acescent fruits, and more universally the putrescency of the animal diet. Hence, I imagine, dilute Wine is not improperly employed in those countries where the food is chiefly animal, as obviating its noxious tendency, and promoting the excretion of the putrescent parts of our food. As used with aliment, Physicians have, indeed, considered Wine as diluent, and moderately stimulating; as antiseptic, and promoting the
secretions;

secretions ; but entirely neglecting its nutritious quality. This, however, as containing *Must*, it certainly possesses.

As a medicine, we must consider the effects of Wine in its different kinds, for according to the kind of Wine, must its effects be diversified.

Wines may be distinguished according to the progress of their fermentation, as crude, mellow, &c. In their crude state, Wines will have all the bad effects mentioned of the *gas sylvestre*. When they are ripe, no such should appear. But in those Wines we call mellow, there is always some unconverted *Must*, some gone over to acidity, and even sometimes are what is called pricked, or apple-tasted. The effects of these will be easily understood, but it is often very difficult to be able to know these states of Wine, for the Merchant takes every method of concealing them. We shall now say somewhat on the different qualities of Wines.

1. *Sweet and Sharp*. Sweetness in Wines may depend on the natural richness of the grape, its maturity, &c. but much more commonly is it the effect of imperfect fermentation, from racking off the vinous liquor from the lees, as soon as the fermentation is tolerably active, into new vessels successively, till once it be checked, and a sweetness remain. Such are the Spanish and Italian Wines. Sweetness also may arise from the Vintner mixing with sharp Wines a quantity of unfermented *Must*. The qualities are easily understood. Where the sweetness, or rather crudeness of the Wine, depends on the quantity of *Must* present, it will have the same effects as *Must*, generate *gas sylvestre*, prove laxative, purgative, &c. Where the sweetness depends on the native richness of the grape, the bad effects will be obviated by the greater quantity of Alcohol, as in Canary and Tokay. But even in these, I am persuaded the richness of the juice, and the viscosity attending it, prevent the generation of as much Alcohol as might be produced ; and accordingly we find that these Wines have always a good deal of the effect of crude Wine.

Sharp Wines may have that property from different causes ;

1. From the nature of the grape, to be judged of according to the climate. Thus the Wines of the Northern countries possess this property more than those of the Southern.
2. Sharpness, whatever be the state of the grape, arises from every active fermentation.
3. Sharpness may proceed from Wines being kept long, and partly converted into vinegar. In one case, then, you see, Sharpness is a symptom of weak Wine, and, therefore, of a cooling, less heating, and less inflammatory liquor. In healthy stomachs these may be more freely indulged, and prove good condiments for animal food, and likely to prove diuretic and antiseptic. When the Sharpness proceeds from an unfinished active fermentation, these Wines may be hurtful, as too cooling, and as debilitating the stomach, and thus produce arthritic and nephritic paroxysms, and *hæmorrhoidal pains*, which also depends very much on the stomach's tone. '

2. *Brisk and Flat* ; *i. e.* more or less poignant. 1. Flatness of Wines may depend on the want of a due degree of fermentation.

2. Flatness may proceed from too great ripeness, or mellowness, and the Wine encreasing in age. Thus Wine kept long in well corked bottles, not having the air necessary for the acetous process, turns simply vapid.
3. When artificial means is used to prevent fermentation, it will induce Flatness, as brandy mixed with wines. Hence the Flatness of the Spanish and Portuguese Wines, in comparison of the French.

Briskness also alone proceeds from an active fermentation present, and always implies more or less of a crude state ; whence, though more agreeable, it is more dangerous. A distinction of Wines is made into those which are apt to affect the nerves and the head, and those which produce fever. Champaign, from using it flowering in the cup, is very apt to intoxicate. Experienced drinkers have a rule for this ; rejecting such Champaign as retains its flower long in the cup.

3. *Strong*

3. *Strong and Weak.* These are compatible with the various other qualities, but entirely depend on the quantity of alcohol. All wines are, in some degree, heating and inflammatory, but their property in these respects is not entirely to be measured from the quantity of alcohol. The same quantity of Wine diluted, intoxicates sooner than the same quantity drank in the same time without that dilution; at least this is a common observation of drinkers. The reason seems to be this, that the Wine, by this means, is applied to a larger surface in the stomach, and its dilution causes a quicker diffusion over the system. Some have endeavoured to explain this from the bulk of liquor in the stomach, but I cannot conceive it in that way. Though Wines thus diluted are, *cæteris paribus*, sooner intoxicating, yet their effects are also sooner over. With regard to the quick diffusion, it is observed, too, that the Wine which provokes urine soonest, is also the sooner intoxicating; which proceeds plainly from its being applied to a larger portion of the system. For whatever other purposes Wines are wanted, either as diluent, diuretic, or antiseptic, the weakest are always to be preferred. Wine, you will now see, like Opium, has a double effect; as stimulant without the narcotic qualities, and, therefore, in these, there can be no safety; but in weak Wine we are safe, because with these we can more easily stop, before the narcotic effects are exerted.

4. *Smooth and Rough.* Smoothness depends on the sweetness or mellowness, except where it is mistaken for flatness.

Roughness depends, 1. On the natural acidity and want of sugar in the juice; 2. On the unripe state of the juice. At first the fruit is of a hard cellular texture, which is filled first in the middle with a fluid, which gradually extends over the fruit; so that within the center is always ripest. Hence the difference between the juice flowing spontaneously, or from the grapes laid above each other, from that which is expressed; for every expression gives acerbity. 3. Roughness may depend on artificial means, as the

addition of flocs, by the vintner. 4. On the addition of husks to Must in fermentation.

Acerb Wines are grateful to the stomach, check acescency, and are astringent over the whole of the *primæ viæ*; except when joined with much sweetness, in which case they determine rather to the vinous than acetous process.

5. *Colour of Wines.* Colour depends very little on the juice of the grape, the red grape, I am well assured, affording a Wine equally transparent with the naturally white. When a red Wine is wanted, the red husks are thrown in, so that, *cæteris paribus*, the red Wines are more astringent. Here we are apt to be deceived. White Wines are rejected when brown and rough, which they grow by age; hence the merchant dyes them red, in which kind of Wines such qualities are expected. Sometimes also, the same practice is performed, from a greater demand at market. Hence little judgment is to be drawn from the Colour of Wines, without, at the same time, taking in the other sensible qualities, and the history of the fermentation.

We should now proceed to give in detail the properties of separate Wines, but our limited knowledge of the history of their fermentation, &c. forces us to speak but very imperfectly upon this subject. We shall in general speak of them, according to the country in which they are produced.

REMARKS on the WINES of different Countries.

The Wines of the Northern climates are generally of a weak body, more acid, and of a more sharp taste, and affording a larger proportion of tartar. The reason of their greater acidity is easily understood. With regard to the tartar of wines, we have not yet spoken of it. Tartar accompanies sharpness and austerity, and thence its effects are to be understood. Though tartar be a purgative, yet in any quantity we drink Wines, they cannot, from
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the tartar, be more active, or exert their purgative quality. Their laxative virtue is owing to the acescent Wine mixing with the bile. It has been alledged, that tartarous Wines are apt to produce the stone in the kidneys; but neither theory nor experience proves this. There is not the least resemblance between the stones, and the tartar in their nature, and Hoffman tells us, that those who drink Rhenish Wine were rather freer of it than the others. Hence, then, the qualities of these Wines depends chiefly on their weakness and acidity, and from these qualities their virtues may be understood. Of this kind are the Moselle, Rhenish, &c.

The Southern Wines are strong, sweet, and unctuous. The Hungarian Wines, *e. g.* Tokay, are supposed the best at present. The Canaries, though more Southern, do not afford Wines so rich as the former. The reason seems to be, that being insular, the grape is exposed to the cooling breezes of the sea. Madeira is the growth of a warm climate; but from an accidental taste, which prevails at present, a particular management of it has been introduced. In Madeira there are mountains upon which they can grow Wines as weak as those of the Northern climates. These, as more acescent, are more grateful, but, at the same time, more dangerous. In order to transportation, they have a quantity of alcohol mixed with them, and after that, to gain a proper degree of activity, require to be kept, for some time, in the warmer climates.

The Italian Wines, as Southern, should be strong, but from their being checked in the fermentation, are sweet and weak. They come over to us in flasks, covered with oil, and cannot be kept above a year.

The Spanish and Portuguese Wines cannot be transported to us without brandy, and are the most inflammatory, and least exhilarating Wines we employ.

The French Wines are certainly, with justice, preferred to the rest. They may be considered as Northern Wines, and the best
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of them are produced in Northern Provinces, the Burgundy and Champaign. The French Wines have heat enough to give them strength, but are not exposed to such an active fermentation as the former, and so not so apt to be combined with Brandy or Alcohol. Champaign is in active fermentation, and not so safe as the mellow Burgundy, but this formerly, from being imported in flasks, was never properly mellowed, and was very heady. This practice is now prohibited, and we have a Wine less delicate, but more safe, particularly to the nerves. Claret, as weak and acerb, and transported without spirit, is safe in every respect.

M A L T L I Q U O R S.

Both from want of care, and the difficulty of conducting the process of their fermentation, these are never so perfect as Wines. They contain much farinaceous matter, and are more nutritious than Wines; but as more acedent, are more laxative; and, as more viscid, less diuretic.

The essential Oils are placed next in our Catalogue, but I shall defer speaking of them till we come to the empyreumatic, under the head of Antispasmodics, when we shall meet them again, and treat of both at once. We go on, therefore, to

A N I M A L S T I M U L A N T S.

As animal bodies are made up of mild and bland substances, and are themselves of a mild nature, it cannot be expected we should have many Stimulants from the animal kingdom. In some, perhaps in all animals, some of the secreted fluids may be acrid, and among the evacuates such shall be mentioned. Here we are confined to the Insect tribe, so very different from the rest.

C A N T H A R I D E S.

The acrimony and stimulus of these, from their common external use, is sufficiently known. So considerable is it, that internally

nally they cannot be given, but in small doses. In large doses their effects might appear general on the system; but as we manage them, even in pretty large doses, they affect the urinary passages only, very little the rest of the system. To me it seems very curious, that thus, without affecting the *primæ viæ*, they should only exert their action on a more distant part of the system. The reason seems to be this. In the *primæ viæ* they are constantly and equally diffused through the whole mass of matter contained there, which is in some measure sufficient to obviate the effect of *Cantharides*, which must be given in a great measure concentrated. In their farther progress in the blood, they are still more diffused, and thence still unactive, but from their connection to a particular portion of the blood; they are again collected in their concentrated form, in the kidneys, and consequently there exert their effects. In proof that it is thus from its dilution, it does not act on the other parts of the body, even in the kidneys, if it is exhibited very weak. I have known half a grain of *Cantharides* bring on a strangury, and yet if this same half grain was diluted in much water, *e. g.* it would have no effect at all. Hence it is very difficult to dose them properly. When carried to the kidneys, they stimulate them, prove diuretic, and hence are recommended in Dropsies. Even here their dilution may in some measure account for their not succeeding, and if that be not the case, they then are found sooner to affect the neck of the bladder, than to prove diuretic. Upon the same footing, they have been used in nephritic cases. It is very doubtful whether Diuretics there are proper at all. Surely those which are inflammatory will be prejudicial. Any effect they exert internally, is, I imagine, from their common enough action on the neck of the bladder, and urethra. By inducing an inflammation there, they cure Gleet. This I have formerly shewn, under the Balsamics, to be a fact, in whatever method it be explained. Whatever method has been recommended in the *Gonorrhœa benigna*, has been also recommended in the *Fluor albus*. Here, from the contiguity of the parts, it may act in the same manner we have mentioned; but to extend that effect, the inflammation in the urinary passages must be so great, as to
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make their exhibition very inconvenient. As diuretic they may be supposed diaphoretic, and hence probably have been recommended in cutaneous diseases, as in the *Lepra* by Dr. Mead. I have seen them exhibited in this disease without any good consequence. This, however, does not contradict their diaphoretic virtue. I imagine the *Lepra* is a topical disease, yielding little to internal remedies, but chiefly to those applied to the part, as bathing, &c. As diuretic and diaphoretic, *Cantharides* have been supposed pectoral. The only case of this kind, in which I know they have been tried, is the Chin-cough, in which Dr. Burton proposed them. As in the same composition was joined the Bark and Camphire to correct the *Cantharides*, I easily saw the Bark was the substance on whose virtue the medicine depended, and therefore used it alone. Other practitioners of my acquaintance took the prescription as it stood, and found themselves exposed to all the inconveniences of *Cantharides*, without obtaining any other good effect than what was got by the Bark alone. These, then, are the virtues of *Cantharides*, which you see are very precarious. As to their effects on the skin, we must take notice of them when we come to other substances which possess the same property.

As to the manner of exhibiting *Gantbarides*, several doubts have arisen, which seem still to remain. As to the antient opinion, of the several parts of the fly being mutual antidotes, that I disregard, and cannot at present decide. A more important disquisition is, to determine whether they ought to be given in substance or solution. In substance they may possibly be given in larger quantity, be gradually extracted, and gradually (and perhaps more successfully) diffused over the system. On the other hand, they are so easily extracted, that we cannot trust much to this; and possibly the common method of giving them in solution answers better. For the watery or spirituous menstruum answers equally well. In what substance, whether resinous or gummy, their virtues consist, is not decided; neither, indeed, is it accurately of any other animal or vegetable substance; neither is it known whether solution does not decompose them

them. With regard to all, the dose is undetermined. This must depend on the state of the body, on the greater quantity of mucus in the kidney, the quantity of urine naturally secreted, or at the particular time in which *Cantbarides* are given. We should begin with small doses, as five drops, &c. and increase them, till once they affect the urinary passages. The simple London Tincture is preferable to the Edinburgh, in which, indeed, the substances added agree with the intention, but in the present form cannot be given in such quantity as to have any effect.

M I L L E P E D E S.

These insects seem to contain a stimulus of the same undetermined nature as *Cantbarides*, to which they are vastly inferior in power. For their ascribed virtues I refer you to writers. I have seen them, for sufficiently long time, exhibited in the *Chlorosis* and *Scrophula*, but was never able to perceive their salutary consequence. Sensible effects they had none at all.

C O C C I N E L L A.

These insects are likely to continue of importance in dying. In medicine they have no remarkable qualities. They have been called diaphoretic and sudorific, but very large doses are required to produce these effects. They are only employed for colouring our *formulae*.

We have now finished our list of particular Stimulants, and come to the general titles added at the end.

I. N U T R I E N T I A, as S T I M U L A N T S.

Whatever increases motion may be considered as stimulant. These, as adding strength to the solids, increase their oscillations, and more as increasing the circulating fluids, and consequently the tension. But their chief effects, as stimulant, is in their action on the stomach. In the hypochondriac, hysteric, arthritic, nephritic

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diseases,

diseases, &c. such Stimuli are often necessary; in the hæmorrhagic, feverish, &c. such are hurtful.

2. ASTRINGENTS as STIMULANTS.

I have formerly explained the notion of these, as Tonics, not so much inducing contraction, but increasing the firmness and tension of the part. This will give a brisker action to the vessels in propelling of the fluids, in overcoming resistance in their way, and resolving obstructions. We find all this effected from the most simple Astringents; but a question arises, whether the Astringent and Aromatic joined would not be more useful? I imagine, where the system is not affected with Fever, it would. But there are cases where the Aromatic and Astringent would be hurtful, *e. g.* in Vernal Intermittents there is often joined an inflammatory diathesis. Here it may be doubted whether the Peruvian Bark, which joins together the Aromatic Bitter and Astringent, should be exhibited. It should be examined whether the simple Astringents would not be preferable. Such subtilities do no harm, provided we are not too much addicted to them in practice.

3. SEDATIVES as STIMULANTS.

These are pretty universally, in their first operation, stimulant, and very often their stimulant qualities affect the action of the heart and vessels.

4. ANTISPASMODICS as STIMULANTS.

The same may be said with regard to these, being in their first operation stimulant; and a question will afterwards occur, whether as Antispasmodics, they do not act as Stimulants? As such, many of them have been set down in the list of Stimulants.

5. ACIDS as STIMULANTS.

Though the effects of these be sedative, yet they, like other Sedatives, are probably stimulant in their first operation. With more confidence have I marked

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6. ALKALINES as STIMULANTS.

Which, in every respect, are stimulant, but not to be considered in that view alone.

7. NEUTRALS as STIMULANTS.

These are more obviously stimulant than Acids, but are attended with the same sedative power.

S E D A T I V A.

Sedatives are such substances as diminish motions in the system, and the force of the moving power. There is a distinction between these two, which is not easy to be made, seeing we suppose the last always to take place. Sedatives may either diminish motion in a part, or in the whole of the system. In this view, blood-letting is a Sedative, as taking off tension; but at present I am only to consider such Sedatives as act particularly upon our nervous power, which can, by medicines, have its mobility entirely destroyed. Their operation on the nervous system is not easy to determine, and as to their ultimate effect, I shall not endeavour to explain it. We know very little of the nervous power, having nothing analagous to it in nature, at least nothing exhibiting analogous effects; for though the powers of the sensitive plant seem somewhat of the same nature, yet they give us no analogy with regard to the operation of medicines. However, by enquiring into this subject, we may discover some laws of the nervous system, and discuss some questions which have arisen on this subject.

The first question we shall take notice of is, Whether the action of Sedatives be mediate or immediate? From my definition, you will see I have assumed the last, but others are of a different opinion. It is commonly supposed, that the motion of the several parts of the body depend on an influx derived from the *Sensorium*. This once being given, we can easily suppose, that when the blood is rari-

fied, and distending the vessels of the brain, it may compress the origin of the nerves, and impede the influx of the nervous power. Hence some have imagined, that Sedatives act by rarifying the blood. Others again have adopted a contrary opinion. *viz.* that Sedatives act by inducing a coagulation or viscosity in the blood, whence the secretion in the brain is destroyed. We may discuss both these opinions together; 1. We conclude Sedatives do not act immediately, from the smallness of the dose required to produce their effect, no medicine in such small quantity acting on our fluids, except in the way of a ferment. 2. Sedatives act after the circulation is taken away, and Dr. Whytt has shown, that after the heart is taken out, Opium has the same effect as before, in stopping the motion of the system, which banishes altogether the notion of Sedatives acting on the blood. 3. Farther, the quick operation of some poisons shews, that medicines, confined to the stomach, can act on the nervous power, and be extended over the system, without any absorption into the blood. I need not here mention experiments where these effects have ensued, and the medicine been found to constrict both its orifices. Whether the effects on the nervous system does not produce changes in the fluids, I shall not deny. It is that probably which has given rise to the mistake.

The immediate action of Sedatives on the nervous power being proved, we proceed to a second question, *viz.* Whether Sedatives act on the nerves to which they are applied, or whether more directly on the *Sensorium commune*? Although we acknowledge a *Sensorium commune*, or prime mover, yet I think it is sufficiently proved, that the nervous power is present in every part of the animal body during life; and that, independent of any new afflux, a motion may be excited; and therefore Sedatives act primarily on the part to which they are applied. There are enough of experiments to show, that the heart, separated from the body, retains its mobility for some time after the separation, will even palpitate of itself, can have its motion renewed by Stimuli, and its mobility destroyed by Sedatives. It is probable, then, the Sedatives act on the part to which they are applied,

applied, and thence propagate their effects to other parts of the nervous system, most easily to the *Sensorium commune*. It has been asked, whether Sedatives act on the Stomach? There is no doubt of it; but these effects appear in those parts which consent most with the stomach, and most easily in the common origin.

Sedatives, acting on the *Sensorium commune*, exert their power in two ways; 1. In destroying the mobility of the nervous fluid there, and so destroying its afflux to the rest of the system; 2. By destroying the mobility in the extreme parts, and so making a resistance to the impulse from the *Sensorium commune*, and consequently making it incapable to receive impression. I can see instances where it is proper to make this distinction. Thus I think cold undoubtedly acts on the extreme nerves, destroys the mobility in these, and at last shuts up the *Sensorium commune* itself.

In order to the universal action of Sedatives in the system, their effects must be exerted in the *Sensorium commune*. But here such effects are found to be very unequal, the reason of which we must now endeavour to explain. This difference of effect seems to be varied, 1. According to the proximity of the part; 2. According to the Stimulus to which it is exposed; 3. According to the habit induced.

1. According to the distance from the *Sensorium commune*. The effect of Sedatives, in large doses, very often appears in palsy of the lower extremities. These, in the experiments on Opium, were found the first to come on, and the last to disappear*. We know

* The connexion of this sentence with the foregoing seems not very evident, and, indeed, the reasoning of the whole paragraph obscure. Upon a comparison with different copies, this seems to be the meaning: "The nervous power is, *ceteris paribus*, weakest in those parts which are most distant from the *Sensorium commune*. Hence, whenever any cause operates on the *Sensorium* in such a manner as to diminish its influence on the rest of the body, the effects will appear most evident in the extremities, as being the parts which, on account of their distance, have the slightest connexion with it. Thus Sedatives show their
" action

whether the action be on the *Sensorium commune*, or extremities, by the convulsive motions appearing first in the head and extending to the extremities, and *à contra*. To this head of distance, I imagine, is to be imputed the effects of Sedatives on the secretories, in suppressing secretions; because these are situated in the extreme vessels every where, and therefore have their moving power affected sooner than the heart. The secretory system to me appears to be a distinct portion from that of the heart and vessels, though contiguous to them, for they are very often differently affected. Nerves enter into the secretory organs, which are not continued from those of the vessels; each particular secretory has Stimuli, that act in a particular manner upon it, without affecting the system of vessels: Motion is sometimes destroyed in the secretories, without affecting the heart and vessels: The principal stimulus to the secretories is that on their excretories, by which not only the excretion, but the secretion is increased, without affecting the rest of the system; as in sucking, or even handling a nurse's nipples, by which not only will the excretion for the time be increased, but the secretion afterwards. Again, in the increased action of the heart and vessels there is no secretion but that of sweat increased. All these distinct effects are to be observed, and perhaps are depending on the head we are now treating of.

“ action by inducing a Palsy of the lower extremities. But the reverse is true in
 “ the case of medicines that excite and increase the action of the *Sensorium* upon
 “ the body. Here the parts situated nearest to the *Sensorium commune* soonest par-
 “ take of its affections. From this consideration, we are furnished with a method
 “ of terminating a dispute among authors concerning the nature of Convulsions.
 “ It has been a subject of controversy, whether they arrive from affections of the
 “ *Sensorium* only; or from irritations of particular portions of the nervous system,
 “ made in the different parts of the body? Both cases, in my opinion, occur, and
 “ are to be distinguished; in the one, by the Convulsion beginning in the ex-
 “ tremities, and gradually spreading over the different parts, till they reach the
 “ *Sensorium*; in the other, by the Convulsions beginning in the muscles of the face,
 “ and extending from thence to the rest of the body.” The rest of the paragraph
 is easy and clear.

2. The

* 2. The effects of Sedatives, or other medicines acting on the *Sensorium*, depend on the exposure of the parts to Stimulus. Thus the heart and lungs have their motions entire, while those of the rest of the system are destroyed. It has been said, that the nerves of these differ, and that in such cases those of the former are not affected. In Apoplexy this last may be sometimes the case; but surely in the case of sleep, and of sedative medicines, no such difference is to be observed; and besides, Dr. Haller has demonstrated, that the nerves of the animal and vital functions are the same, and

* This paragraph is intended to prove, that the action of Sedatives on any part is always varied in proportion to the degree of Stimulus to which that part is exposed. This it does pretty clearly; but there are several things in it, of which I cannot discern the connexion with the rest of the subject. I have, therefore, copied this paragraph from another manuscript, which, though likewise obscure, may, perhaps, serve to make it somewhat more plain.

“ The inequality of the action of Sedatives likewise depends upon the degree of
 “ Stimulus to which the parts are exposed. Thus the heart and lungs are con-
 “ stantly exposed to Stimulus; in consequence of which their actions are but little
 “ affected by Sedatives operating on the *Sensorium commune*, while those of the rest
 “ of the system are destroyed. Authors, indeed, have endeavoured to explain this
 “ effect from the different source of the nerves here affected. They tell us, that
 “ the nerves, by which the vital functions are carried on, arise from the *Cerebellum*;
 “ while those which govern the other functions are derived immediately from the
 “ Brain. Whether this explanation might not be urged with some degree of
 “ plausibility in the case of Apoplexy, is a different question; but surely in the
 “ case of sleep, and in the action of Sedatives, no reason can be assigned, why an
 “ affection of the one can subsist without that of the other. Add to this, that
 “ Dr. Haller has demonstrated that the nerves of the vital functions are not, as
 “ was generally supposed, distinct from those of the rest of the system; and you will
 “ hardly require any thing further to persuade you, that the explanation we have
 “ delivered is by much the more probable, *viz.* that a Stimulus being constantly
 “ applied to the vital organs, and only occasionally to the voluntary ones, the
 “ latter are much more readily and considerably affected than the former.
 “ From hence it follows, that whenever we would wish to have the full effect of
 “ any sedative medicine, care should be taken that every thing which acts on the
 “ organs of sense, every thought which affects the involuntary motion, should be
 “ removed. It may be doubted, indeed, how far this last is practicable. It has
 “ been alledged that the soul always thinks. Not to enter into the subtilty of this
 “ dispute, we may content ourselves with alledging, that we are not conscious of
 “ it, at least, in healthful sleep. Dreams occur only in consequence of *Stimuli*,
 “ and

not distinct as was imagined. Much more properly is the continuation of motion in these to be ascribed to the Stimulus to which they are exposed. Accordingly we see, that this effect is not confined to the heart and lungs, but extended to other parts, in proportion to the Stimulus to which they are exposed. Thus any part of the alimentary canal can be brought into action from the Stimulus of the food, and, in short, by such means, any one part can be kept in motion independent of any other part, notwithstanding the action of Sedatives, or of Sleep, and all this from the Stimulus applied to it. Thus, in

“ and hence do not so frequently happen in the first part of sleep, as towards the
 “ latter end, when, from a retention of the several secretions, an accumulation takes
 “ place, which gives the Stimulus. Of dreams there subsists all the possible de-
 “ grees that can take place between the system's being perfectly awake, and buried
 “ in the most profound sleep. Of the slightest kind, or those which recede least
 “ from a state of perfect wakefulness, are the *Somnambulantes*. It is remarkable
 “ with what steadiness they perform their actions. The reason of which is, that
 “ their attention is not distracted by a number of objects, as in the time of wake-
 “ fulness; besides, being ignorant of the dangerous situation in which they fre-
 “ quently are, they are wholly divested of fear, and, therefore, pay a calm and
 “ undisturbed attention to the thing about which they happen to be employed.

“ But for the most part dreams are extravagantly wild and incoherent. That
 “ they generally bear some conformity to our waking thoughts is acknowledged,
 “ and this happens so frequently, that when we cannot discern it, we ought never-
 “ theless to suppose it. For our thoughts in dreams not depending on the action
 “ of bodies on our external senses, but on internal *Stimuli*, those ideas will gene-
 “ rally be excited, of which there are at that time the strongest impressions in the
 “ mind. These are such as have been the subject of our contemplation the pre-
 “ ceding day, which, being more recent, may be supposed to have their impression
 “ much clearer and stronger than any other. But then they are irregularly
 “ and extravagantly combined; because that power, by which the mind thinks
 “ and judges clearly, requires for its exertion a free and undisturbed *Sensorium*,
 “ which in dreams, being partly free and partly obstructed, occasions this irregu-
 “ larity. This partial obstruction is likewise the cause of the incoherence of our
 “ ideas in delirium, which differs from dreams in this, that here the organs of sense
 “ are awake. We have commonly thought the application of a Stimulus to the
 “ brain sufficient to excite a delirium; but we shall afterwards see, that this will
 “ not do without an obstruction of the *Sensorium*. And accordingly we more
 “ frequently cure a delirium by means that remove the obstruction, than those
 “ that take off the Stimulus.” The conformity between the copies is now so
 great, that I have omitted to copy the rest of this paragraph.

order

order to the action of sleep, or Sedatives, every thing which acts on the organs of sense, every thought which affects the organs of voluntary motion, must be removed. Whether the soul always thinks, we cannot determine, at least we are not conscious of it in healthful sleep. Dreams always occur in consequence of stimuli applied to particular parts, and hence, in the first part of sleep, they are not so apt to occur as in the morning, when accumulation gives stimulus. It is no wonder that the mind, occupied during the day, retains the impression of the stimuli it received at night, and therefore as we see dreams always depending upon stimulus, where such cannot be observed, we must suppose them. Again, the body can be in any degree of waking; and it is thus we must account for the *Somnambulates*. The steadiness of motion in such cases depends on the mind not being sensible to other impressions, or stimuli, because there is a total absence of fear, and therefore a more exact and undisturbed attention to the action we perform. I should have taken notice of the incoherence of our thoughts in dreams. That association of ideas on which judgment is formed, depends on the whole *Sensorium* being free. When this, therefore, is at rest in one part, and awake in another, wildness of thought must necessarily follow. Hence we can understand the nature of delirium, in which, in opposition to sleep, the greatest part of the organs of sense, and the voluntary motions, can be performed, but in which there is an obstruction in the *Sensorium commune*. The incoherence of ideas in delirium depends upon the same cause as in sleep. We have commonly imagined delirium owing to a stimulus applied to the brain, but we shall afterwards see that this will not do without resistance, and accordingly we see delirium oftner removed by taking off the resistance, than by taking off the stimulus; by Antispasmodics than by blood-letting. It is on the stimulus taken off that depends the cessation of secretion and excretion, for these are always excited by the action of stimuli on the motion of the neighbouring parts, &c. Hence we easily see how a Salivation is stopt by sleep, and a Diarrhoea from the same, taking off the action of the parts, and diminishing the flow of the gastric and intestinal li-

U u

quors,

quors, &c. The secretion is stopt at the same time, in so far as it depends on the excretion, as it often does.

The excretion of urine depends on the quantity pressing on the neck of the bladder, and perhaps on the stimulus given by it. This bears a curious application. A small stone falling into the neck of the bladder, by its irritation not allowing a sufficient quantity of urine to be collected for dilating the neck of the bladder, hinders its own expulsion; Opium given here cures the complaint, by taking off, for a time, the mind from the irritation, causing an accumulation of urine, which, when the effects of the Opium are gone, by dilating the neck of the bladder, &c. expels the stone.

3. According to habit are the effects of Sedatives varied. Every motion may become habitual, and then acquire a greater force. From this, as well as the stimulus applied, are the lungs, &c. less affected than the rest of the system. All periodical motions are difficult to remove, and hence it is that Opium has a much greater effect at bed-time, than at any other hour, and this should give us a caution both in the exhibiting Sedatives and Stimulants, which should always be given at the time when the motion or cessation usually occurred, if we want to induce these. It has been thought dangerous to exhibit Opiates during the menstrual flux, even although spasmodic motions should occur at that time; but I have found that Opiates may very safely be given in such cases, and even as taking off the spasmodic affections I have found them to increase the excretion. However, I must own that in such cases caution is required. Sedatives are often useful in preventing the power of morbid habits, and, given before the fit of an Intermit- tent, I have seen them entirely prevent it.

All this explains the inequality of the effects of Sedatives on different parts.

I would also consider what we have said as applying to sleep.

P A R-

P A R T I C U L A R S E D A T I V E S .

Particular Sedatives are of various kinds, and we are not acquainted with all of them, and therefore, whether the operation of all is the same, or indeed analogous, we shall not determine, but observe as far as we may.

Opposite to Numb. 1. is inserted *Sedativa strictius dicta*.

At *a* the title *Rhæades*. Most of the genera comprehended under this natural order are seemingly of the same virtues. The only one we employ in medicine for its sedative powers is the *Papaver*, which I set down as a general title. From the spontaneous exudations of this is got

O P I U M .

With regard to the different kinds, and extraction of this, I refer you to Dr. Alston's paper in the Medical Essays. Opium is one of the most important articles of *Materia Medica*; a medicine of such considerable power, that it may prove deleterious, and destroy the system altogether; and therefore always requiring great caution of exhibition. Not only have the ancients disputed whether it was cold or hot, but we are at this moment disputing whether it acts chiefly as a Stimulant, or whether in any case it acts directly as a Sedative. (*Vid.* Tralles on Opium.) These doubts probably arise from the effects of Opium being mixed, and proving different, according to the dose, the time of exhibition, and the state of the patient. To throw some light upon this subject, I shall lay before you the phenomena which appear on the exhibition of Opium. This I take to be the most difficult part of my task, as these effects are much diversified. I shall only mention the general appearances, which occur on the exhibition of Opium in a proper dose, avoiding the specialities which may occur from use, &c. The effects are these.

U u 2

First,

* First, a frequency of pulse, after which the body is sensibly warmed, generally with a redness and flushing of the countenance. While these effects proceed, a serenity of mind ensues, and a lively imagination, which, when it occurs, is almost constantly of the chearful and pleasurable kind. To these in particular persons often succeed chagrin, irritability, and irascibility. By the time that these become remarkable, the senses appear imperfect, the imagination false, and directly a delirium takes place, and intoxication. The imperfection of the senses proceeds to a total want of sensibility, which end in stupor and appearance of sleep. Under this sleep the pulse is pretty constantly full and frequent, though varying in different persons. During the sleep a sweat takes place, while the other secretions are sensibly diminished. After this the person is awaked, and, if no other stimulus takes place, he is attended with a sense of coldness and weakness. Such is the series of the phænomena, which plainly points out a mixture of Stimulant and Sedative. These, as I said, will vary in different persons, according to the dose. From this mixture of the stimulant and sedative properties the whole may be explained. 1. The stimulant power is exerted on the heart and larger vessels, whence the frequency of pulse, heat, and flushing. Next the stimulant power is exerted on the *Sensorium commune*. I must be content here to say, and it may be demonstrated, that a free flow through the *Sensorium commune* is always attended with serenity of mind, in opposition to chagrin, and that on the same free and equable flow depends the lively, the chearful, and pleasurable imagination. These are the effects of the stimulant power, except such as proceed from it in a secondary way. As the sedative power takes

* Opium given to a healthy person, not accustomed to it, seems to produce no such effects, but is in its primary operation, whether in large or small doses, directly sedative. Whether it may have different effects in diseased persons, or whether it may not be very much diversified by different diseases, are questions that remain to be decided by experience.

place,

place, demonstrable changes follow, partly arising from the increased resistance to the *Sensorium commune*, partly from the increased circulation producing tone and irritation, partly from the imperfect sense, and false imagination. It is difficult to give an account of the reason of gaiety or fullness in different persons, and therefore we shall neglect it. The sedative still mixing with the stimulant power, as in other cases, so here produces delirium, which here, beside the resistance given to the nervous power by the sedative, the stimulant still subsisting, is owing also partly to the false imagination. More directly owing to the sedative power are the Stupor and Sleep. During the Sleep, the fullness of the pulse is owing to the accumulation in the larger vessels, and the laxity induced in them, the frequency of the pulse to the stimulus of the Opium still subsisting unsubdued by the sedative power. The same sedative power destroys the organs of sense, or voluntary motion, as their particular stimulus is removed. The secretions are diminished from the distance, except sweat, which depends on increased circulation.

From the sedative power prevailing, languor, coldness, weakness, and head-ach. If the stimulant power prevail, recurrence of fever, inflammation and pain, especially if any other stimuli are urgent in the system.

From what we have said, the effects (good and bad) of Opium may be understood. It is easy to see, that from the stimulant power of Opium, it may be an excellent cordial, though at the same time, when the stimulant power is great, or other stimuli subsist in the system, it will produce Fever and Inflammation. On the contrary, by its sedative power, it may be even used to correct motion, except in the heart and vessels; that is, in fever. As its sedative power may destroy motion entirely, so also, in particular cases, we may comprehend how it will induce debility. These are the principles upon which may be understood in what manner Opium is hurtful or salutary in different diseases. However, I shall proceed a little farther in detail.

I chuse

I chuse first to begin with the anodyne qualities of Opium as tending to explain the rest. Pain may be considered as of three kinds, arising from three different causes, *viz. Distension, Spasm, and Irritation*; from Distension, more especially of the inflammatory kind, as the Pleurisy; from Spasm, more frequently in the alimentary canal, as in Colic; from Irritation, or acrid Stimulants applied, as in Cancers.

1. In pain from inflammatory Distension. As Opium, in its first operation, encreases the circulation and impetus of the blood, and even in its last accumulates the blood in the larger vessels, and thus brings a stimulus to the heart, it must increase inflammatory distension. When given in such a large dose as to lull the senses, as that its sedative effects do take place, yet as not removing the inflammatory distension, or its cause, and as producing an accumulation in the larger vessels, and as thus causing a severer return of the pains, it must be hurtful in this way also. In inflammatory diseases, which depend for their solution on a particular excretion, as in the Pleurisy, Opium, by checking this, prevents the only safe and salutary crisis of the disease. From all this it is easily understood, why Opium is hurtful in inflammatory pains. But there are some inflammatory diseases, which, though founded on an inflammatory diathesis, are apt to turn chronic, as the Rheumatism. The acute Rheumatism is always an inflammatory disease; the chronic much oftner than is imagined, and to be cured by the antiphlogistic method; so that the use of Opium, in this disease, must at best be doubtful. This will perhaps clear it up. In the absence of fever, in pain of long standing, and confined to a particular part, Opium may be employed for a temporary relief; but in no one instance does it contribute to the cure; nay, even in pains of the longest standing, and confined to the most single part, it will often be hurtful, by increasing the irritation; which gives us great caution as to the free use of it in such cases. It may be applied to a particular part with more safety. This I imagine to be some foundation for the external use of the *Cicuta* being found
of

of benefit in chronic Rheumatisms. There is one instance of the external application of Opium having good effect, *viz.* in the Tooth-ach, which is a pain of the rheumatic kind, sometimes arising from inflammatory Distension, sometimes from Irritation. In the last, it is often useful, applied to the nerves of the part. Whether in the pure rheumatic Tooth-ach it should be employed, I am not certain. I have seen it of service by destroying the nerves of the part. To this head of inflammatory Distension must be referred the use of Opium in the *Gout*. The pains occurring in the extremities, in this disease, are certainly of the inflammatory kind, and therefore Opium may be supposed to encrease these, which indeed I have seen it do, though in so far it is safe, as the health of the body depends on this inflammation. Whether we ought to proceed further, and take off the pain, has been much disputed. The founder practitioners, as Sydenham, are justly of opinion, that the more violent the pain the shorter is its duration, and less hurtful to the system. If the pain be so violent as to overcome all patience, they admit Opium may be given; but then it is very justly added, that it is always with danger of the disease attacking other parts more violently; and I myself have seen instances of it. The rule then is this, that Opium ought not to be employed at the attack of the Gout, nor even at the height of the disease, except some violent symptom ensue from mere irritation of pain. When the pains are gone, it may be given, but then, as weakening the tone of the stomach, it debilitates that power upon which depends the healthy termination of the Gout. However, I must confess, that at the end of the disease, I have often seen good effects follow from it, restoring the patient soon to health, and preventing many an uneasy night. I have known also some who obtained the same effects from taking to a course of spirituous liquors immediately after the removal of the pains. I imagine, then, that if the stimulant effect of the Opium take place here without much of the sedative, and at the same time as sweat is promoted, that the Opium will act chiefly as a strengthener.

To

To this head of inflammatory Distension must be referred a species of it, *viz.* that which occurs in *Suppuration*, an immediate consequence of Inflammation, but different from the first stage of it, of which we have spoken. The use of Opium here may be thought a contradiction to what we have said, but there is certainly a difference between this and Inflammation, although we do not know on what that difference depends. Practice shows, that the pains arising from Suppuration are not only properly and safely allayed, but the Suppuration itself promoted by Opium. Certainly upon this is the use founded of Opium in the *Small Pox*. Did not experience and our own practice make it very evident, we might know, from that of Sydenham, the use of Opium in this disease; though, indeed, long ago it was employed by the Arabians, in the same intention. Some doubts have lately arisen with regard to Sydenham's practice in this disease. It has been observed, that Opium produced Costiveness and Fever, diminishing the secretions, and encreasing the distension and determination to the head. With many, these doubts have checked the use of Opium in the Small-pox altogether. Sydenham takes no precaution to obviate the effects mentioned, and certainly there are some cases where the Costiveness produced by Opium in the Small-pox has, as I have seen, been of advantage. But the better, more safe, and now more common practice is, to obviate the Costiveness by emollient clysters during the whole suppuratory state, and in this way is suppuration promoted by the use of Opium, and all bad effects avoided in this disease. Some are so fond, on the other hand, of Opium in the Small-pox, that they give it in the purely inflammatory state, in the eruptive Fever; but I have always found it hurtful here, and, in general, I think it ought never to be given before the fifth or sixth evening after the attack. As to the secondary Fever of the Small-pox, it is often inflammatory, and we want to obtain a diarrhoea in it, so that here the use of Opium is very absurd. Even where there were the strongest symptoms of determination to the brain and delirium, or what he improperly calls *Phrenitis*, Sydenham gave doses of
Opium

Opium till he overcame that symptom. There are other analogous cases, where the symptoms, which are apt to alarm from the use of Opium, are only to be taken off by a larger exhibition of it. We now come,

2. To the use of Opium in Pains arising from Spasms. These are most effectually in all cases cured by Opium. At all times there have been disputes about the virtues of extraordinary medicines. While Hecquet, at Paris, carries the use of Opium to an extravagant length; on the other hand, the Stablians will not admit it at all; saying it operates merely as a palliative, without removing the cause. Most manifestly here it has a different effect, not only removing the sense of pain, but also its cause. Spasms only subsist in consequence of an unequal distribution of the nervous power, and therefore are to be cured from Stimulants, or Sedatives exhibited. Of what use Opium is in curing Spasms, appears from its being the only successful remedy in those violent spasmodic affections, the *Tetanos* and *Opisthotonos*, which occur in the warmer climates, as you can see from the accounts of Chambers and Hillary. I therefore take it to be a rule, that in all spasmodic affections, and in all pains produced by them, which are not attended with an inflammatory effect, Opium is not only innocent, but necessary, both as a Sedative and Stimulant. We shall here proceed a little in detail. There is no part so liable to spasmodic affections as the alimentary canal, where Opium will not only be useful, as acting on the system in general, but as here being applied to the morbid part, and therefore is Opium so efficacious in all cases of Colics. Spasms in the alimentary canal may arise from a great variety of causes, which sometimes point out a different method of exhibition; though none of them exclude the use of our medicine entirely. To be a little more particular. Spasms of the intestines are sometimes of the hysteric kind, sometimes of the hypochondriac, and frequently pass for one or other of these, when they are properly arthritic. In other cases they are connected with the hæmorrhoidal flux, either attend-

ing the *Molimen hæmorrhoidæum*, or arising in consequence of hæmorrhoidal suppression. In like manner they attend the menstrual flux, happening at the time of its invasion, subsisting, or suppression. Frequently they are owing to repelled eruptions from the surface of the body, frequently to irritations on particular parts, as in the *Nephritis*, where the fit generally extends over the whole of the intestines. In stones in the biliary duct, Spasms are often supposed to proceed from the intestines themselves, but very often they are owing to consent with the duct *. Often Spasms arise from various irritations, as in the Hernia; often from poisons of the Saturnine and Arsenical kind, whence the Saturnine Colic; although we might equally distinguish the Arsenical, or those from irritations in the guts themselves, in consequence of worms. Spasms also arise from various acrimonies in the *primæ viæ*. The bile is commonly accused, though very often Spasms arise from acidities, or crudities, occasioning its greater flow, and from other irritations, as hardened excrements, &c. All these are idiopathic. They have been distinguished into different kinds, the Bilious Colic, Iliac Passion, *Colica Pictonum*, or Dry Belly-ach, &c. To all these we may add Inflammation. In the whole of these, except the last, the cure is generally founded on Opium. In the different species of Colic, varieties arise, which give somewhat different indications, and point out the joining of other substances with the Opium; for in some cases it is an absolute cure, in others only a palliative. In all the cases mentioned Opium is useful, and may be an entire cure, except where Costiveness is to be overcome, acrid matter or hardened fæces to be evacuated. But this exception is by no means so strong as has been imagined, and even where acrid matter and hardened fæces are to be subdued, Opium may be employed. Thus in Diarrhoeas and Choleras, where the evacuation of the acrid matter is very proper, we must not proceed too long with this evacuation, but generally, in such cases where they are violent, must quiet the spasms for some

* Spasms producing pain and anxiety in the intestines have been known to proceed from violent venereal inclinations.

time, and defer the evacuation. The case is much stronger in hardened fæces. Opium certainly produces a slow action of the peristaltic motion, and costiveness; but this costiveness in the Ileus, *e. g.* and *Colica Pictonum*, depends upon spasms, without allaying of which the fæces cannot be expelled, and, in effect, we see purgatives often do no good without Opium. Nay, there are many instances, and I myself have seen of them, where Opium has procured an evacuation without the purgatives. But the Opium and the purgative may be given at the same time, and experience proves, that though it does check the operation of the purgative, it does more than compensate for that, by taking off the spasms. Now I see that practitioners are agreed, that in the Ileus, and Dry Belly-ach, we ought not to wait till the evacuation is procured, but should give the Opium at first, and the purgatives directly afterwards, or very often *simul et semel*. Nothing has misled us more, than supposing the Ileus always attended with Inflammation. If, indeed, we can see undoubted signs of it, the hard frequent pulse, fixed pains, &c. we should stop the exhibition of the Opium. But even with these we are often deceived, and the sudden operation in such cases, and cure produced by the Opium, have evinced, that no Inflammation took place. Often in the Ileus, an *intus* susception arises from Spasms, and Inflammation is only in consequence of that: If you look into writers, as De Haen and Hillary, you will find the use of Opiates well established in the *Colica Pictonum*. I cannot enter into a detail upon this head, but this general rule may suffice, that except in so far as Inflammation may check its use altogether, or in so far as hardened fæces require its exhibition to be deferred, or to be joined with purgatives, there is no case in which the Opium is not of service. We shall here, however, mention particularly the spasmodic pains of the stomach, distinct from those of the intestines, and often arising from acidity, arthritic, hysteric, and hypochondriac affections. Opium certainly may be employed in these, as well as the other cases, but in the three last, as the Diathesis still remains in the system, as Opium is apt to induce a habit, as the fit is often apt to recur, as Opium, by weakening the stomach, tends to make

that recurrence more frequent, it is very doubtful whether, in all cases, such spasmodic affections of the stomach should be checked by this remedy. It would be much better, except where the utmost violence of pain forces the use of Opium, to use riding on horse-back. If Opiates are necessary, they should be mixed with Antispasmodics, or the stimulant Aromatics formerly mentioned, though even with these there is the same danger of habit and weakening as with the Opium. Here many would proceed by Evacuants, as the fit often arises from crudities, and it is on this footing, that vomiting has been prescribed. But there is the same objection to Emetics as to Opium, that they do not take off the cause; and besides, I have seen the tone of the stomach entirely destroyed by their use. Upon the whole, then, in cardialgic pains, there is no one remedy to be depended upon, or always to be continued, but sometimes we must use Evacuants, sometimes warm Aromatics and Antispasmodics, and in more violent cases Opiates.

We shall now say somewhat of Spasms in the other abdominal viscera. 1. As to Spasms in the *Uterus*; these may be of three kinds, 1. at the menstrual period; for beside those mentioned to occur in the alimentary canal at that time, they also take place in the Uterus; 2. more manifestly they occur at the flow of the *Lochia*, in what we call grinding pains; 3. there are cases where spasmodic pains of the Uterus accompany child-birth. In all these Opium is the only effectual remedy. We have already mentioned, under Sedatives in general, that in those pains which precede or accompany the menstrual flux, Opium not only takes off these pains, but, so far from checking the salutary excretion, promotes the free flow. In the grinding pains Opium is also an effectual cure, except where, from any hurt given in delivery, a pain from inflammatory distension is produced, and then we must use it with greater caution. With regard to the pains which accompany birth itself, these are often of the spasmodic kind, and commonly called false pains. It is now an established rule, that Opium takes off these, without hindering the salutary to ensue, and therefore, in all
Spasms

Spasms of the Uterus, is Opium useful, except where they are accompanied with inflammation. I forgot to mention, in talking of the grinding pains, that by long continuance they are apt to induce an inflammatory diathesis, and in such state of them, Opium must be exhibited with very great caution. 2. As to the use of Opium in Spasms of the urinary passages, the kidneys, ureters, and bladder; pains arising from affections of the urinary passages are commonly supposed to proceed from stones sticking in the *tubuli uriniferi*, ureters, or neck of the bladder, and consequently from inflammatory distension; but often also they proceed from Spasms, and there is no other method of accounting for the great pain produced by small stones in the ureters, such stones as would easily pass through them, but from their irritation producing a Spasm which hinders their passage; and hence we must account for the effect Opium is found to have in expediting the evacuation of sand and gravel in nephritic cases. But constantly here we must have in our eye this exception, that whenever the pulse is hard, whenever the person is young and plethoric, we must use bleeding to take off the inflammation, and fomentations to the part. With respect to small stones at the head of the urethra, we have already spoken under Sedatives in general. 3. As to icteric Spasms from stones in the *Ductus choledochus*, I think we frequently see cases where the Spasms in this duct are the cause of obstruction and regurgitation of the bile. The only perfect cure, in such cases, is, from the stones causing the Spasm being dropt out into the intestines. Probably here, as in the case of the ureter, the passage is more slow from the spasmodic affections of the duct, and therefore, in these icteric pains, Opium may be of service, by obviating the irritation, dulling the sense of the duct, and allowing its dilatation.

We next come to talk of the use of Opium in spasmodic affections of the thorax. Perhaps there may be some variety in these. The heart itself is subject to Spasm, at least to palpitation and spasmodico-convulsive motions, but these are not to be cured by opiates. The lungs are, of the thoracic viscera, most frequently subject to Spasms,

Spasms, but these are often without pain, and perhaps I should have made a head of spasmodic affections without pain; but as they are so few, I shall comprehend them under this head. Opium, as increasing the action of the heart, and accelerating the circulation through the lungs, must make the breathing more difficult, and more frequent, and therefore the practice with it in asthmatic cases, has been supposed very nice. I think this may be in such cases a general rule, that in all cases of pure Spasm, Opium is useful; in all cases of infarction hurtful. The spasmodic periodic Asthma is often of a mixed kind, attended with infarction, and terminating by expectoration; so that here the Opium would seem to do more harm, by hindering the excretion, than good, by relieving the Spasm. For the method of proceeding here, I would refer you to Sir John Floyer. He, in such cases, emptied the guts by a glyster, and the stomach by a puke, and then exhibited the Opium. I have followed the same practice with success, and have found, that though the Opium did, in some measure, hinder the expectoration, yet that after the Spasm was taken off by it, the expectoration became more free. Next, as to the use of Opium in spasmodic pains of the head. Head-ach is a very frequent ailment, arising from a very great variety of causes, producing, as I have now found, after endeavouring to distinguish Head-achs from their causes, feelings exactly of the same kind. Of these Head-achs, several are not of a spasmodic nature, in which the Opium is hurtful, as those proceeding from inflammatory pains, and, what is more frequent, from rheumatic affections. There is a third kind, the apoplectic, by which I mean a certain state of the system, where the blood is apt to be collected in great quantity in the veins of the head, and proves the cause of Vertigo, Lethargy, and other soporose affections, where the Opium is also hurtful. In the pure spasmodic Head-achs, which we discern by their happening in persons subject to other Spasms, by their transient continuance, and the remedies used, Opium is useful. These may be considered as of two kinds; idiopathic, where the disease is in the head itself; sympathetic, where it proceeds from connection with other parts, particularly the stomach. In the idiopathic

pathic spasmodic Head-ach, where we can discover it, Opium is useful. In the sympathetic, although Emetics there be indicated, yet Opium is also useful. It is doubted whether the *Clavus hystericus* be idiopathic or sympathetic. Certain I am of having often seen it affected the head, where no other spasmodic affection was present in the system, or occurred for a long time afterwards. As purely spasmodic, this affection is to be cured by Opium. To this may be referred the laceration, &c. of tendons, producing the Locked Jaw, which is now found to be most effectually relieved by Opium. This, perhaps, may rather belong to the head of Irritation, or to Spasms in the extremities. As to the Spasms in the extremities, the Opisthotonos, in which we have already mentioned the good effects of Opium, and referred you to Authors, comprehends them all.

3. We come to the use of Opium in pains arising from *Irritation*. These are of various kinds, not easily to be enumerated. The most remarkable are those which attend Cancers and other Ulcers: In all of these Opium is a safe palliative. Those, who are prejudiced against Opium, condemn it as only a palliative, and often bringing back the pain which it palliated with exacerbation; but this is by no means so often the case as has been imagined. Thus, for instance, if an acrid matter be lodged in the *primæ viæ*, if we can check its effects and take off the spasms, in consequence of the powers of digestion, and the afflux of the animal fluids, the acrimony may be corrected, in some cases even evacuated, and so the Opium prove more than a palliative. Dr. Young imagines it a hurtful palliative, but even his own facts being given, his reasoning upon them is not good. But the facts he alledges do not agree with my experience, and I have often seen the pain eased without any bad consequences. The virtues of the narcotic *Cicuta* leads us to suppose Opium may at least be a safe palliative; but I think more may be added; for I find that Opium will even mend the digestion in Cancers. In other ulcers, attended with pain, Opium also may be exhibited with good effect. These are perhaps the only Irritations we can here speak of. In pains arising from fractures, wounds,

wounds, &c. the temporary relief given by Opiates, as these are of inflammatory nature, will be hurtful. I think it even dangerous, as Young advises, to exhibit them before operations. But in the case of wounds, whether given by art, or design, or got by accident, if tending to suppuration, and accompanied with pain, I think I have not only seen the good effect of Opium in relieving that, but also in promoting the suppuration itself.

The other general head, to which may be referred the cases in which Opium is employed, is in *præternaturally increased Evacuation*. But before we enter upon that, we shall speak of the use of Opium in *Fever*. In Intermittent Fevers the use of Opium was common and constant among the ancients, and we have in this endeavoured to imitate them in modern times. A celebrated writer, in the French Memoirs, has given us an account of his practice with Opium in Intermittents. He was led accidentally to use them from the occurrence of an uncommon degree of spasm; and laying down as a rule, I imagine very properly, that the accession was owing to spasm, he ventured to try the effects of Opium against it. He gave it about an hour before the accession, which it commonly prevented, and procured a mild sweat. If given in the time of the accession, he found it was employed with danger, if long before it, that its effects were lost: He found, that one hour before was what answered best, and allows only a deviation of a quarter more or less. He thinks Intermittents may be distinguished according to their degree of accession; in some very strong spasmodic motions, rigor, tremor, &c. ensuing, in others these being in a much milder degree. It was in the former case he found Opium chiefly of service. It has been a frequent practice to exhibit Opium in different cases. Boerhaave's *Antipyreticum raro fallens* contains two grains of Opium; and, indeed, I imagine it is only from our extraordinary attention to the Bark, that we do not perceive the effects of Opium. We chiefly join it with the Bark to prevent purging, but I think it has also a considerable effect as antispasmodic. In continued Fevers Opium has been more frequently employed. Trallius has bestowed

bestowed much pains on this part of his subject; but he appears to me to argue like a man who had already settled his point, and to have been prejudiced against it; nay, indeed, to overlook, or rather to be totally ignorant of the considerations which should determine the question. In inflammatory Fevers Opium is certainly hurtful, but all Fevers are not of this kind, either in their beginning or continuance; and every body allows now the Nervous Fever, or that wherein the *vis vitæ* is apt to sink; and also that Fever depends on accession and repetition. In the case of the Nervous Fever Opium may be used as a Stimulant, and where the remissions are distinct, and the accessions in consequence, as a Sedative. In the last case it may be used in the same manner as the Bark, and whenever a distinct accession comes on, and it is useful to throw in the Bark, Opium may be also employed. Of these things Trallius takes no notice. Wine, I think, is an analogous remedy, Opium being both sedative and stimulant. In the last intention it is preferable to Opium, as it can be given in a smaller dose, and also from the acid which accompanies it, is less inflammatory, and therefore, on this account, in doubtful cases may be more effectually used, as well as from the subdivided and gradual manner in which we can exhibit it. But I have seen Fevers attended with very strong spasmodic affections, where Camphire, Musk, &c. were used, where the Opium was of much more consequence, and even, as I have seen, it removed delirium itself; and indeed I believe it may be said universally, there is no case in which we use Wine, where we may not also employ Opium.

We now go on to consider the use of Opium in *increased Evacuations*.

The first of these which I shall mention is the Catarrh, an affection in common to the head and breast. In general this disease may be considered as an increased evacuation of mucus, more commonly in the thin acrid state in which it is then immediately secreted. More commonly, however, have we considered Catarrh as a disease

in the membrane of the bronchiæ, and as accompanied with infarction, Opium has been thought of disadvantage. I think the matter may be compromised by these general rules; 1st, Catarrh may be a recent affection from Cold, and then is more or less of an inflammatory and feverish nature, and consequently here Opium may be hurtful and dangerous. But there are many cases of recent Cold, attended with Cough and Catarrh, where I have seen Opium employed with safety, very often operating by diaphoresis or sweat, which obviated its bad effects. A dispute has arisen, whether we should attempt to cure a recent cold by sweating. I have seen such a practice encrease it. In general, if there is any degree of Fever, it is not adviseable to attempt the cure by opiates. 2dly, Where the Catarrh is of long standing, is habitual, not inflammatory, where the stillicidium is thin and acrid, Opium is the only effectual remedy, as taking off the sensibility of the part, stopping the evacuation, and allowing the matter to remain in the follicles till it has obtained its proper consistence and blandness. This I consider as an encreased *excretion*. 3dly, In Catarrhs where there is an encreased *secretion*, and a great deal of gross mucus, seemingly arising from a greater quantity of the fluids, which furnish this mucous matter, being carried to the lungs, I consider the disease as an infarction.

Next the encreased Evacuation, in which we shall consider the effects of Opium, is Vomiting. This might have been referred to the head of Spasm, but as there is an appearance of Evacuation, it is indifferent whether we consider it here or there. With regard to the use of Opium in Vomitings, the practice is difficult, as they may arise from such a prodigious variety of causes. When Vomitings arise from acrid matters taken into the stomach, they must be cured by their expulsion. Thus it would be very absurd to check the effects of poisons swallowed by the exhibition of Opium: But when the Vomiting proceeds from acrid matter generated in the stomach itself, acting as a leaven, and changing into its nature the other juices poured into that organ; when the Vomiting has been drawn out to a great length and proceeds to debilitating, it may be quieted by
Opium.

Opium. Nay, perhaps by this means the matter may be thrown into the intestines, there corrected by a greater afflux of fluids, and by means of a glyster evacuated. Thus in Cholera, where the stomach has been cleared, and the vomiting proceeds from a greater flow of bile caused by an inverted motion of the guts, Opium may be useful, by taking off the inverted motion. Where the vomiting proceeds from inflammation or scirrhusity, Opium is useless, in many such cases hurtful. Where vomiting is a sympathetic affection, from spasms of the alimentary canal communicated to the stomach, Opium is universally useful. There is one case in which it is very doubtful, *viz.* in that Vomiting which occurs in the cold fit of Intermittent Fevers. Some check this by Opium, and some mix it with their saline draughts. If the saline draught could be confined to the stomach, then perhaps Opium might be useful in determining to the surface. But in most cases this Vomiting is a salutary effort of Nature to throw off the offending cause, and to determine to the surface, and therefore ought not to be checked by Opium.

We are now to talk of encreased Evacuations in the lower belly. In Diarrhœa and Dysentery the use of Opium is very common, but the particular circumstances in which it ought to be exhibited are not so well ascertained. Where Dysentery is recent, accompanied with Fever, and perhaps inflammatory diathesis, and, in short, wherever one would think of bleeding in this disease, Opium should not be employed. Some are for considering Dysentery always as an inflammatory disease; but I imagine this is but seldom the case, and where it is not, Opium may be employed. Disputes have arisen on this subject, and it has been said, as giving occasion to the retention of the acrid matter, and hardened fæces, Opium should not be used. To be sure the whole of the cure must not be trusted to it. Dr. Young's arguments, who thinks he has treated this part of his subject very fully, amounts to no more than what we have said of the retention of the acrid matter. But Opium may certainly be compatible with the Eva-

evacuation of these hardened fæces, and acrid matter. Often, as in the *Ileus* and *Colica Pictonum*, they owe their rise to Spasms, and can only be removed by Opiates. As the giving Opium with purgatives has been allowed by Dr. Young himself, I think the whole of the dispute ought to have been superseded, and a general rule been established, that Opium universally may be used, where it does not interfere with the Evacuation. Opium is not to be considered as astringent; it only diminishes the moving powers in the vessels for a time, leaving the system as lax as before.

We shall next consider the effects of Opium in Evacuations of Blood, natural or morbid. The only natural Evacuation of Blood is the menstrual. The increase of this may be considered as of three different kinds. The first, which rarely happens, is attended with an inflammatory diathesis; the second depending upon Spasms; the third on debility, which is seldom free from the second. In the two last, Opium is a safe and useful remedy, but not to be depended upon for a cure; for the astringency of Opium is only temporary, and it is given only as a Palliative, till other Astringents can be used, to give tone to the parts. Nay, I would advise against the too frequent use of it, as it is apt to bring on an inflammatory diathesis. In too great flow of the *Lochiæ* Opium is very proper, for this increasing flux is often attended with spasmodic affections, and debility; but here we must constantly have in our view the inflammatory diathesis, apt to be induced in child-birth. There is a third case analogous to these, *viz.* where pregnant women are threatened with abortion, and already a flow of blood has taken place. There is no case in which the use of Opium is more difficult than this. I have seen it frequently prevented, frequently brought on by bleeding. I dare not confine the bleeding to the plethoric, for even in these has it produced abortion, and therefore I am not ready to mark out the cases where one or the other is proper. Where the disease arises from any cause of inflammatory nature, I would admit that Bleeding is the remedy, and Opium is hurtful. Again, where the flux depends
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on hysteric affections, and there is no inflammation, Bleeding is hurtful, and Opium is the cure. Where the abortion is owing to habit, as every body knows it may, Opium is always useful, and I have seen instances, where by the use of it women retained children, of which they would otherwise have miscarried. The use of Opium in pregnant women is doubtful. Where pregnancy is attended with spasmodic affections of the stomach, &c. Opium would be a palliative, but still it is doubtful if it ought to be used. In every pregnant woman, there is an inflammatory diathesis, and the blood covered with a crust. Though on other occasions, I have used this as an argument against that crust being always a morbid appearance, as in the most healthy women it occurred, yet here I must own, that it gives a suspicion of the inflammatory state, and therefore should make us cautious in the use of Opium. These are the natural Evacuations of Blood. What comes nearest to a natural evacuation is the hæmorrhoidal. I would not allow, with the Stahlians, that the hæmorrhoidal flux is always a natural evacuation, but frequently, from various accidents, it becomes a habit, and a law to the system, and necessary for health. From the nature of the disease, being a distension and collection of blood in the cellular membrane of the *rectum*, often depending on a laxity of the vessels, Opium may be useful; but as costiveness is commonly the cause, which Opium would encrease, it will as frequently be hurtful in this disease. It is only in great urgency, and when the disease is attended with Spasms in the alimentary canal, that the exhibition of Opium should be attempted. In morbid hæmorrhages, there is no doubt but that the sedative power of Opium will relieve their excess; but the hæmorrhagic diathesis is very near a-kin to the inflammatory, and whatever accumulates the fluids in the larger vessels must be hurtful in hæmorrhages, and accordingly we see that when they are repressed by Opium, it is not uncommon to see them return with greater violence. The ancients employed Opium and Hyoscyamus in spitting of blood, and some lately have renewed the practice, though seemingly with a good, yet, in my opinion, always with a doubtful effect. Most
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of the spittings of blood are attended or followed with an inflammatory diathesis, and end in *phthisis pulmonalis*, which is likewise of the same nature, and there the Opium is hurtful. But there are cases of spitting of blood, subsisting for forty years, where there is no tendency to phthisis, or tubercles, and where the disease has arisen merely from an accidental rupture of the vessel, and afterwards kept up by laxity and habit. It is in such cases only in which Opium can be exhibited with any safety.

These are the cases in which Opium is hurtful, or of advantage. Possibly several may be omitted. At present I recollect one, *viz.* the use of Opium in the Measles. The Measles, from being an eruptory disease, and being frequently joined with the Small Pox in Treatises of Physic, has probably had the use of Opium transferred to it, from its being employed in the other. But in the Measles it ought not to be exhibited on the same footing as in the Small Pox, for the Measles is not a suppuratory disease, and it was as a Suppuratory that I said Opium acted in the Small Pox. The Measles are seldom dangerous in their first attack, but afterwards are so, from their inducing more or less of an inflammatory peripneumonic state, and therefore Opium must be used in this disease with caution. A symptom frequently indicates it, *viz.* the Cough which occurs, with thin acrid distillation without much mucus, and I imagine in the beginning it may be employed, but shall not determine whether it would obviate the disease in the lungs. When the eruption is over, and the peripneumonic symptoms are coming on, it is dangerous to give Opium. There is another symptom, the diarrhoea, to wit, which indicates Opium. Nothing better shews the inflammatory state in the Measles than the observation of Sydenham, that the diarrhoea occurring here is best removed by bleeding.

As to the pharmaceutical treatment of Opium, little need be said about it. Its virtues may be extracted equally by every menstruum. All the preparations of it are only made with the inten-

intention of weakening it, which may be much more effectually done by lessening the dose. The great labour bestowed on this head seems entirely useless.

Opposite to *b* stands the title *Umbellatæ*. I have mentioned only two genera of the same order, the rest of which may have similar virtues.

C I C U T A.

Linnaeus applies the term *Cicuta* to the *Cicuta aquatica*, calling this, of which we are speaking, *Conium*. From what we now know of the *Cicuta*, I am apt to suspect we shall find some uncommon virtues in Parsley and Fennel. Fennel has, in effect, been seen to disperse hard Tumors.

Of late the *Cicuta* is so famous, that I need give no account of it, but only refer you to Stork's pamphlet. At the end he has drawn up some corollaries upon the whole of what he has said. At all times externally applied, the *Cicuta* has been known for resolving scirrhus tumors. We now learn it may be applied internally for the same purpose. We imagined that medicines internally given, could not reach the vessels of the affected parts, and I believe we were right in that supposition; for the *Cicuta* probably acts on the nervous power, and communicates its action to the most moving fibre of the body. I leave you then to judge whether it be from encreasing the action of the vessels, or by dissolving the concremented fluids, that the *Cicuta's* action is exerted.

We cannot admit some of the corollaries at the end of Dr. Stork's pamphlet. It is asserted the *Cicuta* has no sensible effects. This contradicts our practice. I have known twelve cases where vertigo was produced, one particularly where the vertigo, and some kinds of convulsion was produced, and although the patient took, at length, forty grains for a dose, yet did the *Cicuta* not cure his disease; and, what was extraordinary, even externally applied had
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the same consequences mentioned. Hence it cannot be so safe to every age and sex as he mentions. Besides, as to the sensible evacuations, I myself have seen the *Cicuta* move the intestines; have good authority for its acting by urine and sweat, but do not indeed know if its effects were different when it had or had not (which was more commonly the case) any sensible evacuation produced by it. Stork recommends the *Cicuta* in the Struma, which is a very vague term, and has been applied to every swelling of the conglobate glands. This does not apply to our Scrophula, which is not a topical disease, but diffused over the whole of the lymphatic system, and occurring more frequently in the young than old. The first, second, ninth, tenth, and thirteenth cases are all different from our Scrophula, except the tenth, which comes nearest to it; and in the other the disease is in old persons, and much farther extended than our Scrophula, in which we have commonly employed the *Cicuta*, and commonly indeed failed, from the reasons given.

From having lately had recommended in Cancers a remedy which failed, I imagine we are too apt to distrust the *Cicuta*. I have seen two desperate cases, one of a Cancer in the lip, and another in the breast, which are nearly cured by it; and have had accounts of others from persons of veracity. For my part, I have no manner of doubt in believing in the success of the Vienna practice. Many circumstances may mislead us in judging of the virtues of the *Cicuta*. We may have applied it to diseases to which it is not suited, as in the Scrophula or Cancers, and Scirrhi, which arise from causes not to be removed by it; we may have failed from using an improper medicine, *i. e.* taken at a wrong time of the year, or a wrong prepared extract; from using it for too short a time, (for in many of Stork's cases a very long time was required;) from too gradual an application perhaps of the dose, by which, when we have attained a large one, we lose its effects; and several other causes to which we do not attend. In many of the cases, both here and at London, the medicine has procured a good suppuration, but gone no further, which I imagine to be owing to the small dose having lost its effects
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by habit. We should therefore interrupt the exhibition or encrease the dose.

C I C U T A A Q U A T I C A.

Since such virtues are found in the common *Cicuta*, we may infer the same to the *Cicuta aquatica*, which was the common suppuratory *Cicuta* of the ancients. Poison and medicine only differ in degree, and I imagine we are very rash in rejecting substances, from suspicion of the danger. I had set this down in order, with that of several others, to give you the history of it as a poison, but that I find our time obliges us to neglect. As poisonous, this plant belongs to the next set, which is a natural order, called by Linnæus

L U R I D Æ,

which he imagines to be poisonous, from their malignant aspect; but the botanical analogy likewise takes place, for all of the same class have the same virtues. Of the six mentioned, the virtues are much the same. Possibly there may be some variety, and indeed experiments seem to show it. We shall only remark upon three of them.

BELLADONNA, or SOLANUM LETHALE, &c.

This is marked out as a poison, which does not exclude it as a medicine. Gesner tells us, that the expressed juice of the berries, made into a syrup, is a safe and useful anodyne; and by a peasant in Utland, infused in wine, it was found to be employed as a cure for the Dysentery. Another author, Regnerus, tells us of its success in cancerous cases, and these are the best testimonies of its virtues, which indeed, from analogy, we should readily expect. Lamberkin abroad, and Gataker at home, have given us instances of its success; and if well attested instances are brought of its success, although it has failed both here and at London, we may judge of it in the same manner as of the *Cicuta*. From my own experience I can say

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somewhat of it. A woman, born of a mother who died of a Cancer, and her son, had, the one a Cancer in the Lip, the other on the Cheek near the angle of the eye. The son, who had the Cancer in the Lip, got the *Belladonna*, began with half a grain, and by degrees had the dose encreased to twelve grains of the dry herb, which produced a good pus in the wound, prevented its spreading, and healed it up, all to a small speck covered with a scab. The medicine had produced a heat, and afterwards a constriction of the fauces, from which it was given up, but the Cancer afterwards breaking out, recourse was again had to the *Belladonna*, and with the same good effect as before, but with the same constriction of the fauces. After this the lad was seized with a vomiting of blood and died. This vomiting of blood I impute to the *Belladonna*. In the mother the Cancer was of fifteen years standing, and began a small erosion, which gradually extended to her eye: She used the *Belladonna* very cautiously, and soon found relief from the pain, found the farther extent of the sore prevented, good pus formed, and at last a contraction of the sore. In this state has she continued for these four years. Whenever the sore again renews, she has recourse again to the medicine, which effectually prevents its extending; nay, sometimes she goes so far as to make it contract a little, but never so much as to heal it up entirely.

There is a case mentioned in Juncker's *Conspectus Therapeiæ*, of what he calls the wonderful effects of the *Belladonna* in curing Cancers, but he also gives us another instance in which it failed. These, and the cases I have mentioned, only show that the *Belladonna* is not fit for all cases of Scirrhus and Cancers, which is also true of the *Cicuta*; but this does not hinder either the one or the other from being a valuable remedy.

HYOSCYAMUS, HENBANE.

This was employed by the ancients as narcotic, in the same manner as Opium, and by some has been said to be more powerful.
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It is said always to produce a quarrelsome humour. Whether this proceeds from the management of the dose, I shall not determine. It has the other common qualities of the *Luridæ*. Several of the Anodynes of the ancients have gone out of use. We are obliged to the courage of Paracelsus for restoring the use of Opium. The *Hyoscyamus* has been employed, by some of the moderns, in Catarrhs and Hæmorrhages, and I believe with the same virtues in such cases as the Opium. The same observations apply to the *Mandragora*, *Solanum*, and *Stramonium*.

N I C O T I A N A, T O B A C C O.

The anodyne and narcotic virtues are here joined with a large proportion of the Stimulant. Every body knows its errhine power, its power of stimulating the stomach and intestines, and internal parts of the system. Its errhine and salivatory powers are too frequently employed. I take the use of it to be very uncertain. As errhine, its effects are lost by habit, though it is supposed to continue to produce the excretion of mucus, which, as it is an excrement, is not of much harm. As salivatory, it does not increase the secretion, and takes off and expends a fluid necessary to the system, palls the appetite, hurts digestion, &c. The same is to be said of the use of it in fumes. Its quality as emetic is valued by some, but I know no advantage it has above other acrids. In the Dysentery, Opium is conjoined with purgatives. The *Nicotiana* possesses in itself both the stimulant and sedative qualities, and by Diemerbroeck has been employed, with advantage, in the disease of which we are speaking. Given by the mouth, it is so liable to prove emetic, that it is very inconveniently employed as a purgative. Given in a glyster it answers much better. Its dose may be from ʒss. to ʒj. in infusion. It is as certain a remedy in all cases where glysters are wanted, as any I know, only if the dose be large, it is apt to produce weakness at stomach, vomiting, and tremors and spasms over the whole body; however, properly exhibited, it is of advantage in many cases. Du Haen has found the fumes of it very efficacious in

the strangulated *Hernia*, *Colica Pictonum*, and *Ileus*; and nothing hinders my employing it, but the want of a proper apparatus, which has been endeavoured to be supplied.

From the effect of the fumes, we see the active parts may, in great measure, be volatilized. Hence we can obtain a milder preparation by boiling. It has been long used in syrup. When the acrimony is taken off by boiling, it may be exhibited with more confidence internally, though its purgative effects are not, by this means, taken off; but here it may be introduced into the system, and prove diuretic and pectoral. If in this state it retain its narcotic and stimulant effects, it may answer better than Opium, or simple Stimulants. Externally, like the *Cicuta*, it has been employed for resolving Scirrhuses; and, made into ointment, has been employed as a detergent, and digestive in Ulcers. I do not know whether it has been employed in Cancers; applied to fresh wounds, it has proved dangerous, and this gives a caution against employing it in open sores.

MISCELLANEOUS LIST.

L A C T U C A.

One species of this is remarkable for its narcotic virtue. I set down this to give you a suspicion of the lactescent plants containing somewhat of the same quality. Its effects in medicine are not ascertained.

L A U R U S.

I intended here to have given the history of the *Lauro-cerasus* as a poison, but must refer you to the Philosophical Transactions, and the experiments of Brown Langrish upon brutes. His experiments would seem to shew, that in a moderate dose it might be employed, but they are not yet sufficiently numerous to be trusted. He finds it produces considerable changes in the blood, but such trials require much caution. But although such change were found, it
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is not owing to its action on the blood itself, but on the system of vessels.

Laurus. This has been long employed in medicine, in bark, leaves, and berries. The kernels resemble those of the Bitter Almond and *Lauro-cerasus*, and on that account have been brought under suspicion. But it is doubtful whether we do not carry this matter too far. Surely the kernels of the black cherry are not of the same qualities with the leaves of the *Lauro-cerasus*. They may contain them in different degrees, and therefore I think it is wrong to reject them. Different parts of the *Laurus* have been employed, as we have said, in medicine, and may still be retained; and I am doubtful whether the Bay-berries, in the *Elixir sacrum*, are properly rejected. While the old composition remained with the Carduus and Bay-berries, I have seen this Elixir cure Intermittents. Their proper use, as carminative, I do not know. Externally, the leaves may be useful. In White Swellings I have used them with success, they in some proving a cure, and in others stopping the progress of the disease.

C O F F E E and T E A.

How far these are properly inserted here, I shall not determine. I set them down, in order to give a suspicion of their deleterious qualities. Much dispute has arisen about their virtues. One would imagine frequent experience would long ago have decided such dispute. Perhaps it is that frequent and universal use, which gives occasion to it. Whenever a medicine comes to be in universal use, many of the operations of nature are ascribed to it; as no person is in perfect health, its effects will be varied in proportion as those who use it recede from the standard. He who errs on the side of rigidity, will find relief from warm water; he who errs on the side of laxity, has his laxity increased by it. If such a medicine, as those we talk of are, act on the nervous system, its effects will be destroyed by habit; as rendered palatable, no good account can be had of its effects; if good, they are magnified; if bad, they are concealed;

nay,

may, we are apt not only to deceive others, but ourselves, and to fancy those qualities we wish to exist. All these circumstances take place with regard to Coffee and Tea. Their effects are, in my opinion, very much mixed; depending on the warm water. All this has so much weight with me, that I cannot speak positively on this head. The assisting digestion, relieving the stomach from a load of aliment, from crudities, and from head-achs arising from them, promoting the secretion of the urine, and perhaps of perspiration, may all fairly be attributed to the warm water. The same, also, will have the effect of keeping from sleep. These are the chief of the virtues ascribed to Tea and Coffee. The weakening the tone of the stomach by frequent use, weakening the system in consequence, inducing tremors and spasmodic affections, are the effects of the Tea itself, though in some measure also of the warm water. This applies to Tea chiefly. I have a stomach very sensible, which I have found to be hurt by Tea, which I attributed to the warm water, but having used some indigenous plants with the same heat of water, I found no harm ensue, and this I have repeated above fifty times. I continue now to use Tea, but without the same effect as before from habit, and also from my advance in life. Many others I know, who have had the same experience. The same effects are not so remarkable in Coffee; but still experience shews them to be of the same nature. From the use of it I have always an arthritic affection of my stomach but no tremor. Farther, I can support what I have said on Tea, from botanical analogy, for it belongs to an order of plants of the narcotic kind, *viz.* the *Coadunatæ*. These narcotic effects are so remarkable, that the people of Asia do not use it till it is a year old. As we have it, it is always of that age, and has its acrimony in some measure dissipated; but as it has an emetic quality, it shews that it is not all gone.

After all, I think we may conclude, that Coffee and Tea, however their effects be varied by habit, or particular constitutions, are here properly placed as Sedatives, as weakening the tone of the system, and diminishing the force of the nervous power.

CROCUS,

C R O C U S, S A F F R O N.

This is properly a substance *sui generis*, being the only instance of the stigmata of flowers employed in medicine. Possibly some curious virtues might be found in employing this part, as it is of a peculiar acrimony. Saffron has been long famous among Physicians, but its effects are not ascertained. In small doses it has no effect; nay even in the largest given by *Materia Medica* writers. I have been attentive in making several experiments with it, and never found it act, except in very large doses, (ʒij.) as a general Stimulant. It has been recommended as emmenagogue, and I have succeeded with it in that intention. But here there is a fallacy, as the natural evacuation may be brought on in time of the remedy being exhibited; and indeed I have much oftener failed than succeeded with it. As to any exhilarating effects, I never perceived them, and as little its anodyne or anti-hysterical. I am sorry Boerhaave should have thrown away so much authority upon this medicine. Indeed he seems to have copied what he says of it, from writers of no authority at all.

N Y M P H Œ A,

Is set down, because it stands in our Dispensatory. The London College have very properly left it out, as its properties are not known. It has been said to be anodyne, &c. and indeed analogy seems to support it, as it is of the same natural order with the Poppies.

W I N E and A L C O H O L.

I have set down these here, as I conceive that they have the same property as Opium at bottom, and that all that has been said of that will apply to them; with this variation, that Wine is less, Alcohol more inflammatory than Opium.

The next thing is the general titles. These may be distributed into three or four classes, *Acids*, *Astringents*, *Neutrals*, *Emollients*, and *Antispasmodics*.

Acids

Acids and Astringents, as Sedatives. Acids have undoubtedly the power of destroying the mobility of the part to which they are applied. They seem too to act as astringent, and therefore are conjoined with these. Many Astringents extend their effects over the system, and while they produce contraction, at the same time destroy the mobility; and it is a frequent remark, that the use of Astringents or Spasmodics is followed by an *Atonia*.

Neutrals as Sedatives. Neutrals are refrigerant, but it is uncertain to what to refer their operation. Both Acids and Neutrals are antiseptic, and by taking off the intestine motion of the fluids, take off the stimulus from the solids.

Emollients may be considered as Sedatives; for by relaxing, they take off the activity from the *Solidum vivum*.

Antispasmodics as Sedatives. These are often Sedatives directly, inasmuch that the general term Sedative might often comprehend both; and indeed, in our list of Sedatives, many of the Antispasmodics have been mentioned. The distinction will be mentioned under the head of Antispasmodics.

A N T I S P A S M O D I C S.

With regard to every affection of the nervous power we have been much in the dark, and so with regard to our ideas of Spasms and Antispasmodics. Gaubius thus defines it: *Spasmus dicitur violenta, invita, inordinata, fibrarum motricium actio*. * Spasm means

* This sentence may be better expressed thus: "The original word *σπασμος*, in the Greek language, signifies no more than *contraction*; and therefore to distinguish the disease which now goes under this name, from those contractions that are the result of our own volition, in the definition of it, we add the term *invita*. This is sufficient for distinguishing it in the voluntary organs. But Spasm likewise occurs in the involuntary organs. We are under a necessity, then, of employing some other terms, which may distinguish the morbid involuntary contractions from the natural ones, which are the immediate agents by which life is kept up. For this purpose we add the terms *violenta et inordinata*. Thus it—"

no more than contraction, and therefore *invita et violenta* are added, and *inordinata* to take in what the voluntary organs indicated by *invita*, the action of the vital organs, *i. e.* when that action is not performed regularly from the stimulus applied to them. Thus the ordinary stimulus to the heart is the venous influx; it is called *inordinata contractio cordis*. All this, however, is not sufficient. It is a law in the human œconomy, that contraction is always succeeded by relaxation. Whenever this contraction continues longer than it ought, a Spasm takes place. If to his definition, then, Gaubius had added *durable*, it would have been more perfect. But a question here arises, *viz.* whether Spasm is to be considered as a single contraction only, continuing longer than it ought, or whether Spasm is to be considered as an inordinate contraction frequently returned? On this Gaubius says, *Qui Spasmm a convulsione distinguunt illum vocant continuam, hanc alternantem musculorum contractionem*, and very properly; for there is certainly a distinction between spasm and convulsive motion. Gaubius subjoins very well: *Perinde fuerit, num eodem, an diversis nominibus utere. Uterque enim effectus ad idem genus pertinet, partes easdem occupat, similesque et causas et differentias agnoscit, quin et, baud raro, alius in alium transit.* Spasm, then, is the single contraction, convulsive motion the inordinate. If we use the word Spasm, we must comprehend under it spasmodic motion, and by Antispasmodic mean such medicines as are suited to take off either or both affections.

As to their manner of operation it is difficult to explain. Spasm may depend either on an extraordinary influx of the nervous power into the part, * or, again, an unequal distribution of it. Hence it is seen why both Stimulants and Sedatives are Antispasmodics. But besides the more obvious Stimulants and Sedatives there are others distinct from these. Stimulants universally prove so to the sanguiferous system; even the Sedatives have often the same pro-

* In another copy, too great mobility, and a weakness of the nervous power, are mentioned as the second cause of Spasm, to be remedied by Stimulants.

perty, which is wanting in Antispasmodics. On the other hand, Antispasmodics have no narcotic property, so that they are distinct medicines from both. We shall, however, have occasion to say, that even our Antispasmodics are connected intimately with these heads; but this is not yet clear, and most of our list are antispasmodic, more than in proportion to the stimulant or sedative properties. Antispasmodics are taken from the three kingdoms, and, in general, their virtue seems to reside in an oil; in vegetables, in an essential oil; in animals and fossiles, in somewhat analogous.

FOSSILE ANTISPASMODICS.

A M B R A G R I S E A.

The real origin of Ambergrise has been disputed. Two particulars we know, that it is neither of animal nor vegetable origin, being always found in the sea, or thrown out upon its shores; and that its chemical analysis affords the same principle as *Succinum*, viz. *Petroleum*. As grateful to the nerves it may be called cephalic and cordial, but this gives no distinct idea. Possibly it may have the same qualities as Musk, but the analogy is not here perfect, and experiment must determine it. Odorous bodies, and almost those only, are Antispasmodics; but odour may sometimes reside in so small a part of the subject as to have no effect on the body.

S U C C I N U M, A M B E R.

This has been employed in medicine; but I believe is not soluble in our fluids, nor in any menstruum out of the body, so that it can be given in sufficient quantity to exert powerful effects. Hence it must have no virtues, and, after many experiments, I have found this to be the case. The preparations of Amber have been more employed than Amber in substance. An acid salt is got from it, which afterwards is enumerated under the Acids. In its own nature it is not antispasmodic, and any virtue it may have of that kind is owing to its oil. This oil is very much of the same nature
with

with *Petroleum*, and an oil of the same kind is to be procured from pit-coal, and other bituminous substances, and therefore we may talk of the virtues of fossile oils at once, except that the fire may alter them, by giving more or less of empyreuma and acrimony; but all of them, by proper rectification, may be brought to the same degree of purity. We shall then talk of them under the general title of

P E T R O L E U M.

All fossile oils have been reputed antispasmodic, but are likewise very powerful Stimulants, and by this means often unfit for use. They have been received as pectoral, and the same cautions take place with regard to them, as with regard to other acrids used in that intention; for many chronic diseases of the breast are of inflammatory nature. Besides their antispasmodic virtue, the fossile oils have had ascribed to them that of emmenagogue. Their use in this intention must be where there are spasmodic affections of the uterus: But I have often been deceived with them when these affections were present. They are of so much reputation with the women, that they take them unprescribed, and I have known cases where they have been given to procure abortion, but even in very large doses without the effect, they only disturbing the system in general. I must here, however, take notice, that our *Petroleum* is commonly adulterated with two thirds of oil of turpentine, so that, properly speaking, the cases mentioned were only trials of the oil of turpentine. Fossile oils have been said to be useful in Quartans, and, indeed, I conceive this probably to belong to every Anti-spasmodic. Externally applied, their effects are more considerable and more ardent. Anointed on the extremities they are said to defend them from cold, and this virtue has been ascribed to the Oil of Turpentine and Amber; but on trial they never could be applied without irritation, and disappointing the effect. They have been recommended in œdematous swellings, upon the supposition that that disease depended on a laxity of the part; but œdematous swellings are often attended with an erisypelatous in-

flammation and tendency to gangrene, which last I have seen brought on by the application of *Petroleum*. But here we need not be anxious about topical applications, for none of them are of any service except bandages in convalescents, as the swelling commonly depends on a fault in the system. In paralytic cases they are more effectually employed. Here they sometimes penetrate deep in the system, but I have no faith of their being capable to stimulate the *Medulla spinalis* when rubbed along the spine; nor have I any notion of their stopping Intermittents when rubbed upon the breast. It has also been used in rheumatic pains, but whether it acts here from its stimulant or antispasmodic virtues is uncertain.

VEGETABLE ANTISPASMODICS.

With regard to the antispasmodic plants, most of them might have been inserted among the Stimulants. Of the first set, at *a*, *Artemisia* and *Matricaria* might have been mentioned among the *Syngenesia*; *Cardiaca* and *Pulegium* among the *Verticillatae*; *Cuminum*, *Levisticum*, and *Meum* among the *Umbelliferae*; and *Sabina* with the *Coniferae*. All these have the virtues of their order. They are repeated here, on account of a rank and foetid odour they possess, which, with some other qualities joined to them, is the foundation of their antispasmodic virtue. All Antispasmodics are odorous: In some, the odour is of the fragrant kind, but more commonly as it grows are directly foetid.

At *a* is inserted the title

HERBÆ FOETIDÆ.

All these may be useful in spasmodic affections. Some of them are recommended in epileptic cases, but this not so universally. Much oftner have they been used in Spasms of the alimentary canal, or what is called the Hysterical disease. Nay, their action has been supposed to extend farther, and to take off those spasms in the uterus, which are the cause of the obstruction of the menses, and other

other symptoms attending thereon. These are the general qualities of these plants. We shall only make remarks on a few of them.

ARISTOLOCHIA.

This might have been marked with the acrid Bitters, formerly mentioned. Its acrimony appears, from its vomiting in a large dose. It enters into the composition of the Gout Powders, and has at all times been famous in this disease. A medicine has lately come over from Germany, taken by some here for the same complaint, which is found to be a tincture of the *Aristolochia* and *Serpentaria* joined. The tincture of *Aristolochia* is openly used by others in the same intention.

The same observations are to be made with regard to the *Aristolochia* in the Gout, as on the Gout Powder in general. It is this which Boerhaave tells us, and which Haller repeats, that takes off the villous coat of the stomach; and this perhaps, in some measure, may point out its use in the Gout. *Artemisia* is more foetid than the rest of the class, and hence has been supposed stronger; but I imagine it has no title to any virtues but what are contained in Wormwood.

ATRIPLEX OLIDA.

This gives out a saline matter, both volatile and fixed, in greater proportion than any other plant I know. Indeed it seems *sui generis*, and may perhaps have some peculiar virtues. Its odour is not very volatile, and the plant can be very well preserved, both in extract and by drying. I have not seen many trials made with it. Several times, however, in form of tea, I have seen it of advantage in hysteric cases.

RUTA.

This is a plant of several peculiarities. Although this plant does not contain much essential oil, on which I said the virtues of the set we are talking of depended, yet it has rather a stronger anti-spasmodic.

spasmodic virtue than any of them. As its parts are pretty fixed, the virtues of this plant may be got pretty entire, either in inspissated juice, or as extracted from the plant. Rue particularly has been recommended in Epilepsies and hysteric complaints, and wherever in such cases the complaints can be bettered by stimulants, Rue may be employed. All the plants we have mentioned may be called anthelmintic, and none more properly than the Rue. By the mouth it will not go so far in any quantity in which we exhibit it; but in a glyster, a strong decoction of it is often employed to destroy the *ascarides* which infest the *rectum*.

S A B I N A

abounds in essential oil more than the rest, and is a powerful stimulant, insomuch that, externally applied, it has been said to destroy worms. I have not seen this effect. Internally it has the same qualities with the former.

Opposite to *b* is inserted the title of

G U M M A T A F O E T I D A.

The *Tacamabaca*, which stands at the end, might be inserted with the *Storax* and *Labdanum*. The other five are very much of common virtues. They are all taken from umbelliferous plants, which indeed are most peculiar to Europe, and therefore as the Gums of these exotics come so often to us adulterated, we should carefully endeavour to find something of the same kind in our own plants. Though I have formerly pointed out the *Umbelliferae* as poisonous, and the Gums might be supposed of the same virtues, yet as such qualities are often lost by drying, I would hence insinuate, that some of the most acrid juices of our own plants may prove the most excellent medicines. Of *Assafætida*, *Galbanum*, and *Sagapenum*, the virtues seem manifestly lodged in an essential oil, which rises either with water or spirit. The oil of *Opopanax* is more sparing, and the *Gum Ammoniac* gives no essential oil at all in distillation.

distillation. Hence I would alledge, that of those which have the greatest proportion of essential oil the antispasmodic virtues are greatest, and so in proportion. They all stimulate the stomach, and in the countries where they are produced are employed to excite appetite and promote digestion. With us they are used as stimulant and antispasmodic, proving carminative in the stomach and intestines, and used to take off the remarkable spasmodic affections happening in the alimentary canal in the hysteric disease. Like Aloes they are laxative to a certain degree, and like this, too, by frequent use, are apt to irritate the *rectum*, though neither in their irritant or purgative qualities are they so powerful as Aloes. These, like the *Fœtidæ* formerly mentioned, have been used as anthelmintic; and there are frequent instances of strong odour affecting the insect tribe. *Assa fœtida* has been long employed for this purpose, and lately has again been brought into practice. In the blood they are frequently diuretic, but are more remarkable still for their diaphoretic virtues. Sanctorius testifies, that the *Assa fœtida* is the strongest in this last virtue. From these qualities they may be justly reckoned pectoral, not only promoting the secretion of mucus in the lungs, but perhaps also as carrying thither their antispasmodic virtues. The Ammoniac being recommended as the most powerful pectoral, would make me doubt of this last supposition; but for my part, I am apt to give the preference to the *Assa fœtida*, which, however, is one of the warm pectorals most frequently abused. Like Castor, these gums have been employed in Fevers, and where we can judge the proper time of exhibiting stimulant Antispasmodics, they might be useful; but as I find their stimulant exceed their antispasmodic virtue, I employ them very little. Their emmenagogue property I consider as an effect on the whole system, and shall afterwards mention it. I imagine it is not without some foundation, that they have been said to occasion a rarefaction and turgescence of the whole mass of blood. With regard to Aloes, this is in a manner proved, it not only inducing the hæmorrhoidal flux, but also promoting other hæmorrhages, and possibly, by this means, the menstrual evacuation. In general, as an-

tispas-

vispasmotic, the more subtle the odour the better, and therefore I imagine it is not without reason, that *Affafætida*, in our present practice, seems to have supplanted the rest.

As to all, for the purpose of medicine, they are of easy preparation, and may be extracted either by water or spirit, more effectually by the last. The dose is difficult to assign, not only on the account of their different effects on different persons, but also from their strength varying according to the time kept. I exhibit them from five grains to ʒj. I have known ʒij. of *Affafætida* taken in twenty-four hours with little effect, but this must not be taken as a general rule, and probably depended on the impurity of the medicine.

C A M P H I R E.

This is a substance, which, for the good or harm it can do in medicine, deserves particular attention. It is a substance of a very peculiar kind in nature, like to which we can produce nothing by art. It approaches in its nature to the essential oils, is got from vegetables by distillation with water, is of an acrid odour, and soluble in Alcohol; but, like these, it does not suffer a decomposition with distillation, nor separate as they do into oil, acid, and earth, but rises always in the same manner as before. It differs also in its relation to acids, uniting with them without effervescence, and separable from them by affusion of water, without any change. We may allow, lastly, its mode of concretion to be peculiar. It is alledged, indeed, that something of the same kind is to be seen in essential oils. I have always perceived this concretion in essential oils to be different, and more approaching to regular chrySTALLIZATION. What is to be made of these peculiarities, I cannot determine. As to its botanical analogy, it is got from a species of the *Laurus*. Our common *Laurus*, in its sensible qualities, is nearly related to the *Lauro-cerasus*, which I mentioned as a strong Sedative; and, indeed, all the substances which have the laurel bitter, are justly suspected of the same nature. Camphire, though more poignant, appears

pears to me to have the same taste and odour, and therefore, in the first place, I would insinuate a suspicion of the same qualities, and consequently a caution in the exhibition. Mangini, of Bologna, has been employed in making experiments with Camphire upon different animals, and has found it poisonous to every one of them. Birds were killed with a few grains, and large doses either drove into a rage, or destroyed, quadrupeds. I have only these accounts from a Literary Journal. From it, however, it appears, that in some animals it produced sleep, followed by death, without any other symptom; that in others, before death, they were awakened into convulsions and rage. It seems, too, to act chiefly on the stomach, for an entire piece swallowed, produced the effects mentioned, with very little diminution of weight, as appeared from its being afterward thrown up. I mention all this, to shew the power of Camphire on the system, and at the same time to point out its danger.

The virtues of Camphire have been much disputed. You will easily see how that happens, from the different effects of different doses on different constitutions. Its considerable acrimony, strong odour, and that of the disagreeable kind, would lead us to think Camphire a stimulant. These sensible qualities have given occasion to a dispute not yet properly determined, whether this medicine be heating or cooling. In the fauces it produces heat, and in some, when taken into the stomach, it is rejected with an uneasy sensation, at the same time producing heat, while in others it may be taken in large doses, without any sensible effect at all. Disputes also have arisen about the reason of the diversity of the effects of Camphire. Some account for it from the Camphire being taken in entire pieces, and alledge, that in our powders there are always some entire molecules, which, from their less specific gravity, are buoyed up, and stimulate the sensible upper orifice of the stomach, and produce the heat mentioned. This certainly ought to give us a caution, in order to the minute division of Camphire, when exhibited. But to proceed in its heating and cooling effects. I think it is now pretty generally agreed, that it is rather cooling, not stimulating the heart

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and vessels, nor producing exacerbation of Fever. In short, the antispasmodic virtues of Camphire are the only ones agreed upon, and it is for this, and such like disputed substances, that we must make a distinct head of Antispasmodics.

As antispasmodic, it has frequently been employed in the hysteric disease, and complaints of the hypochondriac kind, and wherever these are purely spasmodic, in a proper dose, it may be of service. Camphire has also been employed in *Mania*. Dr. Kinneir, in the Philosophical Transactions, gives us several instances of *Manias* cured by it, when given in the dose of ʒss. I am ready to believe the Doctor's success; but there are several different kinds of *Mania*, and, after several experiments, I cannot say the Camphire succeeded. Sometimes, indeed, it produced a quieter night and day, but never effected a cure; but in a disease so obstinate, and so adapted to violent remedies, the Camphire ought not too hastily to be rejected. Like other Antispasmodics, Camphire has not been much recommended, perhaps from the uncertainty of its effects, and the great variety of causes from which that disease may proceed; and indeed I have seen it fail in Epilepsy. But in other cases I have seen its good effects, and where the fits were frequent, it often produced large intervals; and where the disease was in some measure accidental, arising from passions of the mind, as fear, &c. I have seen it work a perfect cure.

The chief use of Camphire has been in Fever. Whether there it acts as an Antispasmodic, I shall leave you to decide. Some extend it universally to all Fevers, while others confine its use to those of the malignant kind, recommend it even in the Plague itself, in putrid Fevers, and all those attended with Exanthemata, as the miliary, and petechial Fevers. In this country we have no proper malignant Fever, so that I cannot speak as to its use in these. We use it in the nervous Fever, where the *vis vitæ* is sunk, and there find it of great service, and I begin to think we should find it of still greater, were we to employ it in larger doses. Heucher, in his
Differ-

Dissertation, entitled, *Ignis igne extinguendus*, who appears to have much experience upon this subject, recommends Camphire in Fevers of all kinds, especially the last we have mentioned. Pouteau, who attends an hospital of lying-in women, in a book lately published, entitled, *Melange de Chirurgie*, tells us, that an epidemic seized upon the women, attacking them with Colic and a Fever, whose symptoms shewed it of an inflammatory nature, and where, on dissection, the bowels were found inflamed, which inflammation extended to the uterus, whose inner membrane appeared livid and gangrenous. Here Mr. Pouteau exhibited Camphire, dissolved in oil, and made into a syrup, in the quantity of five grains, of which three doses were repeated in half an hour, and one five hours after, and so on till about thirty grains a day, by which means he operated a perfect cure. As to the manner of action: In one woman, after delivery, who was seized with a violent pain and colic, and in whom the disease was urgent, the Camphire was given to the quantity of sixty grains in half an hour, by which she was entirely relieved; but upon being put to bed, was seized with a paleness and chillness, which seemed to threaten instant expiration, which symptoms were relieved by warm wine, and the application of warm cloths. The coldness was without any *frisson*, or shivering, and ended with a sweat, and the woman was quite well afterwards. An instance analagous to this has occurred to myself, of a maniac, who got forty grains of Camphire at once, and fell down cold and pale, with a weak and small pulse, but soon after recovered. Another instance of the effect of Camphire you may see in Dr. Hoffman, in the first volume of his Consultations, in a case entitled, *De Camphoræ in Dosi ʒij. effectu*. I have mentioned all these instances, to shew the effects of Camphire as a Sedative, in weakening the motions of the system, in weakening the action of the heart and vessels. But to go on with the use of Camphire in Fevers. Pouteau alledges, that Camphire is of no use in a Phlegmon, but in the Erysipelas is a perfect cure. He tells us it is of use in vernal Pleurifies and Peripneumonies, which, he says, are of the erysipelatous kind, and that it was from seeing in the case of the

women, the erisypelatous nature of the inflammation upon dissection, that led him then to the use of Camphire. This sort of reasoning is very doubtful. The Erisypelas and Phlegmon are very difficult to distinguish, and in our practice here we use Camphire promiscuously in all external inflammations, and seemingly with equal success, sometimes answering and sometimes failing. There is one case, viz. in rheumatic affections, which approaches nearer to the phlegmonic nature, where we find the Camphire of particular use. If externally the distinction between Erisypelas and Phlegmon is so difficult, it must be more so internally. There are very few authors who take notice of internal Erisypelas. You may see an instance of it in Lommius; but such are very rare. It was therefore incumbent on Mr. Pouteau to distinguish them; for Vernal Pleurifies and Peripneumonies are here, and, as far as I have been able to learn, over the torrid zone, of a general inflammatory nature. Nay, we may go farther, and say, that even Pouteau's dissections seem to show the inflammation of a phlegmonic nature. If we can make any proper distinction between Phlegmon and Erisypelas, it is this, that the Phlegmon is in the proper cellular membrane below the skin, while Erisypelas is situated in the rete mucosum. Hence, then, we are rather to take Mr. Pouteau's facts as instances of the powers of Camphire in inflammatory cases in general. Although we cannot admit of the distinction here, yet there is another curious enough instance given by the same Gentleman. He tells us, that a Gangrene is surrounded with an erisypelatous circle, which seems to be the cause of its spreading, and that, on the exhibition of Camphire, the progress of the mortification is stopped, and the Erisypelas changed into a Phlegmon. So much for the use of Camphire in Fever. Hoffman, in his treatise, *De tuto Camphoræ usu interno*, gives us a great many instances of Nervous Fevers cured by Camphire, and also some of the purely inflammatory kind. Here we do not employ it in the last mentioned cases. When the effects of Camphire are not evident, I imagine it is from not throwing it in in sufficient large doses.

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As a-kin to its effects in inflammatory cases, we shall next mention the use of Camphire in Hæmorrhages. Hoffman, and the German Physicians recommend it strongly in Hæmorrhages of all kinds, and when given in the dose of ʒß. it does not encrease the frequency of the pulse, and so possibly may be of advantage; but I have had no experience of it. This quality does not agree with another ascribed to Camphire, *viz.* promoting the menstrual flux, which from its antispasmodic power it may. Neither is this easily reconciled with another effect attributed to Camphire, *viz.* giving fluidity to the blood. I could wish the experiments upon which such conclusions have been formed had been more accurately examined.

Hoffman mentions the use of Camphire in the *Lues Venerea*, in all its stages, and even in a recent Gonorrhœa recommends it as a most effectual remedy. Hoffman, in this case, appears not to have spoken from his own practice, and, indeed, he talks very loosely upon the subject, and not condescending on the manner of exhibition. Possibly in the recent Gonorrhœa it might be rubbed externally on the penis, in the manner of unction, in order to allay the inflammation, which is the first thing indicated in that disease, and in the more advanced state of the disease might be joined with other diaphoretics. Possibly some might think here of its acting in another way. Camphire has been said to weaken the genital powers. It is not easy, from experience, to determine this. Some experiments mentioned in authors seem directly to contradict it; and from these Camphire seems rather to promote venery. However, if it has the power of allaying Inflammation, stopping Hæmorrhage, and acting as a powerful Sedative to the system in general, I must say I would expect that it should also weaken the genital parts.

This leads to another disease, *viz.* where an inordinate venereal stimulus produces nocturnal pollutions or emissions without erection. The cure here is extremely difficult, for the disease appears attended!

tended with a weakness of the whole nervous system, and those affected in the manner mentioned, are some of the most remarkable Hypochondriacs I have seen. In first treating this disease, I thought of interrupting the habit, and gave Opium in this intention. Sometimes for once it would stop the recurrence, but on frequent exhibition I found it rather to encrease the disease from its stimulating and accumulating properties. I therefore had recourse to Camphire, which I found have the desired effect. It was exhibited at bed-time, as anodyne, and the patient at other times took Chalybeates. These are the particular diseases, in which Camphire has been employed. We shall now talk of some general qualities attributed to it.

Camphire has been spoken of for its soporific virtue. In any quantity in which we give Camphire in the human body, I have never seen this effect. It is never evident, except when there is an irritation, which Camphire, by taking off, allows the natural tendency to take place. Another general quality attributed to Camphire is that of diaphoretic. Here, in so far as diaphoresis may be promoted by relaxing the surface of the body, and taking off stricture, Camphire may be of use; but in so far as a stimulus is wanting, Camphire is of none at all; and I have seen \mathfrak{gij} . of it given without any effect, and probably when diaphoretic in Fever, it acts by taking off the inflammation, the stimulus still subsisting.

Camphire has been said to be antiseptic, and to this quality Pringle attributes its effect in malignant Fevers. From what we have said formerly, and Mangini's experiments, it is probable that Camphire acts on the stomach; though if any substance in small quantity can be antiseptic to our fluids, Camphire has a very good chance to be so, as so easily diffusible and penetrating over the whole system.

EM P Y-

1.

EMPYREUMATIC OILS.

The Empyreumatic Oils of Vegetables have probably the same virtues as those of Animals, though at present out of use. The changes wrought both on these Oils, and those of Animals, by repeated distillations, will be seen in the Chemistry, which see. Lewis commends the Edinburgh Dispensatory for rejecting the *Oil. Lateritiæ*; but this is only to be understood of its present form; for by the changes wrought on it by repeated distillation, we have all the reason in the world to suppose its general action on the nervous system and antispasmodic qualities to approach to those of the Empyreumatic Oils of Animals. * The Chemist, who has brought these into reputation, repeated the distillation forty times; and in the German Dispensatories, the process is directed to be performed fifteen or twenty times. It were greatly to be wished, that some means were found to shorten a process, which, for its expence and tediousness, our Chemists and Apothecaries would be so unwilling to undergo†. From its *factor* in the first distillation, we might suppose the Empyreumatic Oil of Animals antispasmodic, but then this *factor* is joined with so strong an acrimony, that the stimulant overpowers the antispasmodic virtue. Thus Hoffman tells

* Dippelius..

† The addition of water, and distilling from thence, is the method proposed for expediting this process by most authors. Beaumé proposes the applications of *Æther*. He alledges, that by the mixture of this, a thick gummy matter is precipitated from the Empyreumatic Oil, and that the liquor above remains more pure. He says also, that by this management more may be done by two distillations, than by ten without it.

These Empyreumatic Oils, whether procured from animals or vegetables, are of the same nature, and when brought to the utmost degree of purity, are very valuable medicines. In that state they become clear and limpid, suffer a great diminution of their specific gravity, are remarkably more volatile, and have their odour and taste much improved. They likewise become soluble in vinous spirits. By long or frequent exposure to the atmosphere they lose these qualities and return to their empyreumatic state. Hence they should be kept in small phials, close stopped, and never suffered to remain open any length of time.

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us, that a few drops of the *Oleum C. C.* will throw a strong man into a profuse sweat, but by repeated distillations this *fætor* is taken off, and the Oils are improved greatly in volatility, their antispasmodic virtues, at every repeated distillation, are encreased, and they approach to the nature of Camphire. Were it not for their dearness, they might certainly externally be employed as antispasmodic. In this way they have been employed for curing Cataracts. In one case they checked the progress of the disease, and alleviated the symptoms; in another, which was not of long standing, the Cataract was entirely dissolved. Internally, the Empyreumatic Oils of Animals have been used in hysteric and hypochondriac affections; but what they have been chiefly famous in, is the Epilepsy, and I think unluckily; for this disease often may depend on causes out of the reach of Antispasmodics, and, when it is, there are few which can make such a change in the system as to take off the irritability; and I imagine that Antispasmodics often fail, both in hysteric and hypochondriac cases, because we employ them at all times, whereby they become habitual and familiar to the system, and lose their effect when given in the time of the paroxysm, where alone we ought to employ them. To take off the irritability we must rely on Sedatives and Astringents. The Empyreumatic Oils have likewise been famous in Intermittent Fevers, when given like Opium before the paroxysm. They have also been used in Continued Fever, and with some, with all the reputation of Camphire; though this use of them has been founded on few experiments. They have been still more famous than Camphire for their anodyne properties, but, like it, I imagine they act rather by taking off spasm and irritation, than by any properties directly anodyne.

Æ T H E R.

Æther is very analogous to the substances of which we have been just treating. It is an oily matter, colourless when pure, and soluble in alcohol, resembling, as I would alledge, in taste and flavour, the substances of which we have been talking, and though
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of different production, yet of similar virtues. Its effects as anti-spasmodic are now sufficiently known. It has been found useful in Head-achs of the spasmodic kind; nay, even in inflammatory and rheumatic Head-achs. There is one case, *viz.* the Tooth-ach, in which, if properly applied, it not only gives a momentary, but durable relief. In order to its action, it must be converted into vapour, which is done by the heat of the body, and therefore, in applying it, we cover the part with the palm of the hand, in order to drive back the vapour, and prevent its dissipation in the air. It would be worth while to imitate the same practice with Camphire. The Æther is more volatile, has some advantages over the Camphire, and becomes more quickly applied to the particular nerves affected. Hence Æther is properly preferred to it in all spasmodic affections of the stomach and *primæ viæ*. The method of exhibiting it, is by diffusion in water, by which means, if not dissipated, it will probably act more powerfully. How far its use might be extended to other spasmodic cases, I do not know. Perhaps it might be employed in Epilepsy. In Fevers it is not employed; but if you consult Dr. Hoffman, you will find it often employed here; and in so far as his testimony is to be taken for a medicine of his own invention, (for the *Liquor anodynus mineralis* is nothing else but Æther diffused in Spirit of Wine,) and by which he was to obtain profit, it is found of considerable virtues.

E S S E N T I A L O I L S.

These are separated and deposited in particular cells, existing more copiously sometimes in one, and sometimes in another part of the vegetable. These we can sometimes obtain exactly as Nature prepares them, by opening the cellular texture of plants, and treating them by expression. But this is seldom practicable, and we are obliged to have recourse to the aid of distillation. But from the heat applied we should always be on our guard against any changes they undergo in distillation, either from excess of heat giving them an empyreumatic taint, or raising along with them a portion of grosser matter.

C c c

matter. Procured with all the art possible, Essential Oils are liable to suffer considerable changes on being kept, and to lose their *spiritus rector* and medical portion, unless accurately secured from the air. The *spiritus rector* has, indeed, gone off, but in inconsiderable quantity, but the remainder is so entangled in the now thickened Oil, as not to exert its medical virtues. All this shows us, that if we depend on any virtues in the Essential Oils, we must use them as recent as possible.

The virtues of Essential Oils are generally those of the Plants, from which they are derived. Formerly it was supposed they contained all the virtues of their respective subjects, and hence were called Essences; but this we now find is the case with very few. The virtues of Plants are not always confined to these odorous parts. We are not to expect the Astringency of Cinnamon in its Essential Oil, or the Bitterness of Wormwood. Hence it might be supposed, we could talk in general of the virtues of Essential Oils as distinct; but there are not yet a sufficient number of experiments to enable us to attempt this, or to determine their differences.

Essential Oils are chiefly taken from the class of Stimulants. The *Verticillatæ* all give out an Essential Oil, the virtues of which are more in common than that of the Plants themselves; for these often have their distinguishing property depending on a more fixed part. With regard to the *Umbellatæ*, the same seems to take place; but sufficient experiments have not been made to determine, whether the Essential Oils of this class partake of its poisonous qualities. The *Siliquosæ* are not commonly supposed to contain an Essential Oil, but accurate experiments now show that they do, and that an Essential Oil, of a valuable kind probably, as very volatile, pungent, and diffusible, and the more volatile and penetrating the parts, the more antispasmodic virtues we find. The *spiritus rector* is very copious in Mustard and Horse-radish, and so also is, probably, in their Essential Oil. The same observations

tions possibly apply to the Oils of the *Alliacea*. A particular kind of Essential Oils is got from the *Coniferae*, affording us the several balsamic substances. The Oils of the aromatic class approach to the nature of Camphire. The Oils of other substances have different virtues, which will be understood from what we have said of the virtues of their respective plants residing in a volatile or fixed part.

All the Essential Oils have been introduced as antispasmodic, but fall short of Camphire, Empyreumatic Oils, or Æther. Their action is more confined to the part to which they are applied, and hence they are more remarkable as Carminatives, than in their effects on the system. They, too, have more of a stimulus than any of the substances we have been mentioning, and therefore they should be given to the torpid and flaccid, and not to the inflammatory.

From their not containing all the virtues of the subjects from whence they are drawn, and from their frequent adulteration, a great many of the Essential Oils have been rejected from practice, and even those which are still in our dispensatories, rarely occur in prescription. We are, however, apt to run into excess, both in our favours and prejudices, and possibly there may be exceptions to our general rules. What we have said of Essential Oils applies still more to distilled waters; for the impregnation in them is inconsiderable, inasmuch, that little virtues are now expected from them. Even here, however, there are exceptions, and we see Pepper-mint water is a very valuable medicine, both as carminative and antispasmodic in the *primæ viæ*, and this virtue probably is more active in the water than in the Essential Oils. This is somewhat contradictory to what we were just now saying; but certain it is, that several plants have their Essential Oils and distilled Waters more active than in the plant in substance. A glaring instance we have of this in the *Lauro-cerasus*, which Langrish found of such pernicious properties in distilled Waters, and of a much milder nature when exhibited in substance.

M U S K.

As approaching to the former substances in virtues, I chuse to treat of Musk here. Musk is among the few medicines afforded us by the animal kingdom. It is an animal substance of a peculiar kind, containing a considerable portion of Essential Oil, and on that account belonging to the antispasmodic class. It is extremely volatile, quickly diffused, the most odoriferous substance in nature, and at the same time the most retentive of its odour. Musk has long stood in the list of officinal medicines, but its virtues, I imagine, have not been known till of late; for which we are entirely obliged to the Chinese. As by them taught to exhibit it in a large dose, we have found it a valuable antispasmodic, and indeed have used it in all kinds of spasmodic affections. We have employed it in hysteric and hypochondiac affections, which we are very apt to think always to take place, when there are spasmodic affections of the alimentary canal; whereas they often proceed from Gout; but even here Musk has been found of advantage, and it has been known to cure a Gout in the stomach, as may be seen in the London Essays. In short, it is limited to no spasmodic affection. It has been found of advantage in the Hiccup, and from Hillary we learn, in those violent spasmodic affections called the *Colica pictorum*. The analogy has not been extended to the *Uterus*, though I think it may. Musk is often useful in Epilepsy, but with the same restriction as we have given already upon the use of Emphyreumatic Oils there. In the *Tetanus*, we learn from Hillary, that Musk, conjoined with Opium, is an effectual remedy. The Musk, as we now employ it, was chiefly introduced for its effects in the *Rabies canina*, by the Chinese, and its efficacy here is now sufficiently known; and, indeed, we have reason to imagine it will be successfully employed there, as it is pretty generally thought, that this disease is only to be considered as a spasmodic affection; and wherever we are doubtful of the nature of the disease, we may reasonably deduce it from the nature of the remedy employed.

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In Fever, too, Musk has been exhibited. Whether this is always to be considered as a spasmodic affection, I shall not determine; but wherever these occur, accompanied with tremors, *subfultus tendinum*, &c. Musk not only is effectual in relieving these, but in taking off the Fever itself. From Dr. Wall's practice we find it has been of use, where an inflammatory diathesis is present; but whether properly it ought to be employed in such case, I shall not determine. In all the nervous and malignant Fevers, Musk is of signal advantage; and Mr. Reid has found it of great efficacy in the jail distemper. I wonder Dr. Pringle says nothing of its use in these diseases. From this, however, I would conclude, he has no material objection to it. He gives, indeed, an instance, where its effects, he says, were not so sudden as in Mr. Reid's cases, but this was far from making a fair trial.

There is one other disease in which Musk has been employed, *viz.* in *Mania*. This disease often depends upon causes not to be removed by any medicine, and is often hereditary. In such circumstances, Musk, like other remedies, fails: But I have seen Musk have more effect than any other remedy. I have seen a cure obtained by it; and in other cases it would probably have the same effect, had the dose been largely continued.

Z I B E T H U M, C I V E T.

Civet is an odorous, oily, animal substance, which we may therefore suppose of similar virtues to Musk; but I know nothing in practice that either confirms or confutes this analogy.

C A S T O R.

This is more frequently employed. It has its virtues depending on an Essential Oil. Besides this and the two former, I know few animal substances of the same kind. In the Castor the odour is not so volatile, and is of the fetid kind, which has been supposed the foundation of its antispasmodic virtue; but from the analogy of Musk
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we see, that agreeable odours may be antispasmodic as well as fetid. Castor has been employed as an antihysterical, and in feverish cases. Like the Essential Oils it has a stimulant joined with an antispasmodic quality, and is often more hurtful by the former than advantageous by the latter. Its antispasmodic qualities otherwise are by no means remarkable, whence it is, that Castor of late has been much neglected in practice.

In our Dispensatory stand both a simple and compound tincture of Castor, the former intended for those with whom *Assa fœtida* disagrees. There have been disputes about the menstruum, but it is now agreed that pure Alcohol is best, and that any other menstruum extracts more of the disagreeable, and less of the useful parts. Our College, in the compound tincture, have attempted a refinement, and ordered the extraction to be made by the *Spiritus volatilis oleosus*, but this limits the dose of the Castor, and weakens the spirit, which gives us a weaker impregnation.

The next thing we consider is the proportion; and in ordering a greater quantity of Castor, the Edinburgh College is the more judicious. Nay, Alcohol will dissolve more Castor than is commonly imagined. The first extraction is of the most subtle kind, the others less useful, and more disagreeable. Hence I think we might employ cohobation; employ, e. g. ℥j. of Alcohol, to extract ʒj. of Castor, and then apply the same Alcohol to fresh parcels of the drug.

CASSUMUNIAR, PÆONIA, VALERIANA SYLVESTRIS.

We have, in the account of the substance in the Catalogue, been obliged to transpose a little, in order to bring our most powerful Antispasmodics together.

Cassumuniar should not have stood in this part of our list, but along with the *Zedoary* and *Serpentaria*. With the *Zedoary* it agrees both in botanical analogy and sensible qualities, and hence its virtues

virtues may be deduced. It is now, however, disregarded, though formerly in high reputation, on account of that favour we so lavishly bestow upon exotic medicines.

Pæony has long stood in our lists, but I can find no writer or practitioner who can give testimony of its virtues from particular experience. Besides, there is a suspicion of its poisonous qualities, and botanical analogy inserts it into an acrid class.

Valeriana Sylvestris is the only one of the three which is at present in repute as an Antispasmodic. It was introduced on the authority of Fabius Columna, one of the restorers of botanical knowledge, and a man of industry and discernment. He tells us, he cured himself of an Epilepsy by it. It was afterwards disregarded, but is now used in every species of spasmodic affection. Its odour seems to point out this quality; but for my part, after having seen it employed in a number of cases, it has failed altogether, or produced very inconsiderable effects. Physicians acknowledge this, but say it is owing to the smallness of the dose. Linnæus, who seems to have had a good opinion of Valerian, marks, as the medium dose, zij . of the root in powder. I have given to the quantity of ʒss . without any effect. However, I am apt to think this might be owing to the badness of the medicine. Valerian is only perfect when it is taken up in the spring, before its leaves are shot out; whereas we commonly get it as taken up at the end of summer, when it is flowering. When in proper condition, it is alledged to be gently purgative and diuretic. It contains a considerable portion of saline matter, which supports its diuretic virtue.

The dose in which Valerian must be exhibited in substance, shews that little advantage can be got in extracting it by any menstruum, as we can hardly get one in which it could be taken in sufficient quantity. Hence the impropriety of Alcohol, Brandy, or even Wine. Water is the only menstruum by which we can extract it, and at the same time could exhibit it, thus extracted, in sufficient quantity.

quantity. The London College infuse it in *Spt. volatilis aromaticus*, but it is plain that this must give but a weak impregnation, that the impregnation got can only be exhibited in very small doses, and that the whole of its virtues must depend upon the menstruum. It is the chief ingredient in our *Tinctura Cephalica*.

VOLATILE ALKALI.

I have said that the antispasmodic virtue resided in Essential Oil. There seems an exception with regard to the volatile alkaline salts, but if we consider their origin, and inflammability with nitre, this exception will not appear so striking as would be at first imagined. As Musk is the most odoriferous of natural substances, so Volatile Alkali is the most odoriferous of the artificial. Upon this footing it has been frequently experienced a powerful Antispasmodic. It is considerably acrid when applied to the tongue, and that in inconsiderable quantity; but if by any means we could defend from its action the mouth and fauces, it might be thrown into the stomach in a large dose, even without inconvenience. From its volatility and subtilty it proves the quickest Antispasmodic in the stomach in nervous affections. I have said these spasmodic affections often depend upon Gout.

Hence it is employed in all cases of Fever, where Stimulants and Antispasmodics are necessary. In consequence of those virtues, it is a powerful Diaphoretic. On this account it has been said to be alexipharmic, or expelling poison and contagion of all kinds. Now we know that in the case of poison, as well as many others, we ought not so much to regard the cause as the effects, *viz.* the spasmodic affections, &c. commonly produced. It is on this account Jussieu, in France, has found the Volatile Alkali, after repeated trials, so useful in obviating the effects of the bite of the viper. Thus from the nature of the remedy, we may fairly make a judgment of the nature of the disease. But with regard to its effects in determining to the surface. The danger of Fevers depends mostly on the

the cold fit, and it is in the cold fit of Intermittents that most people die. To relieve this, we have not many medicines, but the Volatile Alkali is employed with advantage. This cold fit appears in various forms, and I have seen it often appear in a stretching of the chest, and cough. The Volatile Alkali given here, brings on an agreeable heat, and determines powerfully to the surface. It is also recommended as pectoral on the same footing. We cannot omit saying somewhat here as to the antiseptic quality attributed to it by Pringle. It is as possessing this virtue, that he employs it in malignant and putrid Fever; but it is evident, from the small quantity in which it acts, and the suddenness of the operation, that, as antiseptic to our fluids, it is of no efficacy, and that it acts almost entirely in the stomach.

Formerly it was supposed that the Volatile Alkali differed according to the substances from which it was procured; but now we know, that, if equally pure, it is always one and the same. Got from Sal Ammoniac, it is pure; as procured from animal substances, it is contaminated with empyreumatic oil, and perhaps that oil contributes to its virtues; but surely the difference cannot be great; and if we want to join such an Antispasmodic along with it, we should chuse one whose dose and effects we can better ascertain, *e. g.* the *Oleum animale*. But there is another more considerable difference, *viz.* as it is employed in its caustic, or mild state. Certainly, as an application to the nostrils, the former is preferable, and the French practice with *Eau de Luce*, confirmed, indeed, by our own experience, shews the usefulness of that impregnation. It acts without inconvenience, and more suddenly, which is a great matter; and indeed I make no doubt, but that in almost all cases it would be preferable, could we defend from its acrimony the mouth and fauces.

F U L I G O, S O O T.

I have set down this among the Vegetables, although I believe there is little difference between the vegetable and fossile Soots. An

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arsenical

arsenical matter, however, may accompany frequently the fossile Soot, volatilized with the pyrites contained in fossile inflammables, and therefore a proper caution is necessary when we use it as a medicine. Soot is a very heterogeneous substance, containing, besides Sal Ammoniac, a quantity of naked Volatile Alkali, enveloped more or less in an empyreumatic oil. The Volatile Alkali is very apt to fly off, and hence we should use the Soot as fresh as possible. Even as the Volatile Alkali and Oil stand in Soot, they are certainly antispasmodic; and I have known obstinate head-achs cured by the use of Soot, in the dose of ʒss. continued for some days; but then in other cases it failed in the same disease.

As Fuligo even fails in substance, much more will it do so in the weak impregnation obtained by tincture. The *Affa fætida* joined to it may be of some advantage, but that can be very little. The London College gives us a tincture of *Affa fætida* with Soot, which may be useful, as the menstruum employed extracts the Essential Oil, on which its virtues depend; but even there the dose is limited by the menstruum.

We have now finished particular Antispasmodics, and have, according to our custom, subjoined some general titles: *Astringents*, *Emollients*, *Demulcents*, *Stimulants*, *Sedatives*.

Astringents are antispasmodic, by taking off the laxity on which mobility depends. All our Antispasmodics are only effectual in the time of the fit. It is Astringents which we must use to obviate the return of Spasm, and when Spasm occurs, Antispasmodics. To obviate Spasm we use Iron, Lead, Copper, and Peruvian Bark. Spasm may sometimes be owing to an over distension, as well as laxity, and hence *Emollients*, by relaxing the simple solids, may take off the continuance of the Spasm. A very frequent cause of Spasm is Acrimony. *Demulcents*, by obtunding this, will take off the Spasm, by lessening or removing the cause. It is a doubt whether all our
Antispas-

Antispasmodics are not stimulant or sedative. Very frequently at least we can refer them to one of these heads.

We have now finished the consideration of Medicines which act on the Solids. These, as most important, we have considered first; for the Medicines which act upon the Fluids, do so commonly in consequence of acting on the Solids. I do not say this is the constant, but certainly it is the general case, and every day we see Writers, as well as Practitioners, inclining to the pathology of the solids.

The medicines, which act on the fluids, are divided into those, 1. Which act on the circulating fluids; 2. Into the evacuants, or those which act on the excretions. The *Alterantia*, or those medicines which act on the fluids still remaining in the system, may be divided into two kinds; 1st, into such as affect their consistence or cohesion; 2dly, into such as affect the mixture of our fluids. To the first head belong the *Attenuantia* and *Inspissantia*; to the second head the *Demulcentia*, *Antacida*, *Antalkalina*, and *Antiseptica*. Before we enter into the consideration of these, we shall endeavour to say something on the nature of Animal Fluids in general, whether with regard to their chemical consideration, or with regard to *Materia Medica*.

On the NATURE of ANIMAL FLUIDS.

This I consider as the most difficult part of the task in which I have been engaged. Most of what has been said or wrote upon this subject is very imperfect. There was no book in which I expected more than the second volume of Haller's Physiology; but as a compilation, I find it only collected from those, whose views are not opened on the subject, and still leaving us as uncertain as before. Perhaps more is contained in that book than any where else; but there is scarcely a page in which I cannot see faults, in which I cannot point out errors. There are two other authors from whom

materials may be drawn; Gaubius, in his Pathology, and Senac, in his treatise *Du Cœur*. Even in these, however, the materials are involved in obscurity, or error. Formerly I intended to have taken Gaubius for a text, but I found I should be so often engaged in criticism, that it would have been very disagreeable to those who are engaged in the beginning of study. I do not pretend to correct the errors of these writers, but only to point out what I think is fully established on the subject. All the fluids in animal bodies must be, if not formally, yet materially present in the common mass of blood. In considering this, then, we consider the foundation of all the rest.

In the common mass of blood three different portions may be discerned. First, the coagulable lymph; secondly, the red globules; thirdly, the serosity. These three portions are constantly observable in the blood of animals. There are, indeed, a set of animals called the *Exsanguia*, but I find that there are very few of these, even those of the insect tribe, but what contain more or less of the abovementioned portions. Although these be the proper constituent parts of animal blood, yet it must be allowed there are several others occasionally present, as, *e. g.* a quantity of unassimilated chyle, and, though not so constantly, a quantity of re-absorbed secreted liquors, either of those intended to be thrown out of the body, or of those secreted into particular cavities, for particular purposes. Besides these, there may be, on various occasions, a number of extraneous matters, not capable of being converted into animal fluids, taken in with our aliment, or given in the way of medicine, &c. which are conveyed out of the system, as soon as the laws of the œconomy admit. These we shall talk of afterwards. At present we proceed to consider those principal portions we have mentioned; and first,

C O A G U L A B L E L Y M P H.

This was first taken notice of by Malphigi, under the title of the *Pars fibrosa sanguinis*, and is what Davies and others call the *Gluten*.

Gluten. I keep to the term imposed by Senac, before whose writings it had not been taken notice of as a constant constituent part of the blood. That it is always present, is shown by easy experiments, by washing the *crassamentum*, by agitating the blood drawn from veins or arteries in a close vessel, and pouring off the other parts from it, and by coagulating the serum. It is also found both in the diseased and healthy, appearing in the form of what is called inflammatory crust.

From examining it, in consequence of the experiments above-mentioned, it appears to be that portion of the blood most disposed to concrete upon stagnation, or cooling of the whole; and, therefore, the foundation of the concretion in extravasated blood. From concreting along with the colouring parts, it has commonly escaped the notice of Physicians. When freed of this colouring part, it appears more or less white, perfectly mild and bland, resembling, in sensible qualities, and chemical principles, the *albumen ovi* of oviparous animals; whence I conclude them to be entirely the same substances, only that the coagulable lymph can never be got so accurately separated, as the *albumen ovi*. As that serves for the nourishment of the chick, so the coagulable lymph is the nutritious part of animal fluid, that into which our aliment is converted, and that in consequence of whose changes the solid parts of the body are formed. This is confirmed when we compare it with animal solids, which, upon chemical trials, and other appearances, are evidently one and the same kind of matter. The coagulable lymph is chiefly acted upon, or undergoes changes, in consequence of heat, cold, or putrefaction. It is not to be changed by any substances which can be taken into the vessels of animals consistent with life. It is, indeed, affected by concentrated acids, caustic alkali, and neutrals, but never with these when taken in by the mouth, and when injected into the vessels they produce death.

2. RED GLOBULES.

By former Physiologists these were considered as a very great proportion of our fluids; but are now found, in comparison with the whole, to come in but for a very small share. In other respects they are not near so much the object of our attention as formerly; for the Lewenhoeckian doctrine now is entirely exploded, which no observation, even with the microscope, has confirmed, and which every later observation contradicts. Every experiment proves them to be a distinct part of the blood.

The chief property of red globules is, that they refuse mixture, and are only diffused in the other parts. With the serosity they even admit not of diffusion; and though joined to the coagulable lymph, yet is there no intimate union, and the two portions can be easily separated without decomposition. It is on account of this want of miscibility, that they appear in a globular form, in the same manner as oil in water, or, if the oil be in greater proportion, water in oil. We never can see the ultimate particles of bodies; and whenever we see a globular appearance in mixed bodies, we must conclude it is only in consequence of diffusion. Gaubius supposes the red globules of an oily nature; but their more ready diffusibility with water, preferable to the serum or coagulable lymph, contradicts this opinion. Neither, indeed, will they unite with oils, which holds true with no other oily body I know. It has been said they are inflammable, and give out much oil in distillation; but against this it may reasonably be alledged, that those who made the experiment were not sufficiently accurate in separating them from the other parts. Thus we have said what the red globules are not, I wish we could say what they are. We have called them globular; but Haller and Senac dispute about this, the one calling them globular, the other lenticular. Another question has arisen, *viz*: Whether every single globule is of a red colour; or whether they only attain that when placed in a quantity above each other, in the same manner as happens in tinged
 glass;

glass, which, if divided into thin films, becomes transparent and colourless; but if these transparent colourless films be laid above each other, the same colour as formerly again appears.. Haller says, that the globules have singly their red colour; Senac the contrary. We may allow to Senac, that if the single globules are red, they are but faintly so, and that it depends chiefly on the admixture of the whole; and that the deepness or brightness of the red depends on the diffusion or concentration of the red globules.. I am inclined to think of their separate red colour; for in very small proportion they give colour to a large quantity of water. The nature of this part of our blood depends so much on microscopical observations, and these are so liable to error, that we cannot depend upon one particular which has been said concerning it.. It is said that the red globules remain not only of the same size, in the same animal, at different times, but in all different animals at all times.. If this were true, it would be very difficult to account for; but I imagine the fact is not accurately established. Whether the colour of the red globules is heightened or lessened by particular circumstances, and what is the reason of these changes, is a great *desideratum*; but not determined. That they are changed by putrefaction, may be allowed; but that ever their ultimate particles are changed, require confirmation, or that any medicines exist which have the power of altering their colour or form. In short, how the red globules are produced, to what purpose they serve, in what proportion they exist, and by what powers they are altered, seems altogether unknown..

3. S E R O S I T Y.

Allowed to cool, the blood spontaneously separates into *Crassamentum* and *Serum*. These are commonly thought homogeneous, but it is found the *Crassamentum* is compounded of the two last parts which we have mentioned, and the *Serum* of the *Lympha coagulabilis*, and the portion which by Senac has been properly called Serosity, or that watery part which runs out of the pores of the cut. *Serum* when coagulated. It is observed, that, when warm, the *Serum*

rum shews both a taste and odour, which experiment finds to be owing to the serosity, which consists of pure water with saline matters dissolved, and probably a portion of an oily matter adhering, and which is found to possess the taste and odour mentioned, more or less strongly, in proportion as it has been accurately separated from the coagulable lymph. The Serosity, then, is to be considered as a separate part of the blood, and from many circumstances it appears a-kin to the urine in the kidneys, and to be properly the excrementitious part of the blood. As putrefaction renders volatile, saline and oily matters, it is no wonder how they come to exist in the serosity. It is these which probably fly off in the *halitus sanguinis*, which is not, as some have imagined, a distinct part, but found by experiment to be of the same nature with the serosity. Whether a peculiar matter flies off along with the Serosity, is not so easy to decide. Experiments shew, that air is contained in the blood, but whether this be common or fixed air, is not determined. Shut up accurately in close vessels, the blood remains remarkably fluid for a long time. Air is, in some measure, the foundation of fluidity in water, and on both these accounts may perhaps be supposed the foundation of fluidity in our blood. The only author from whom you will, perhaps, gain any knowledge on the Serosity of the Blood, is Mr. Senac.

With regard to the union of the Serosity with the other parts of the blood. It pretty manifestly does not unite with the red globules. I said that the red globules were washed out with the Serum, but then they very soon precipitate to the bottom. How far the Serosity unites with the coagulable lymph, is not so certain. It is plain that a portion of the coagulable lymph spontaneously separates from the Serosity, to form the *crassamentum*, but then another part goes along with the Serosity; but I imagine there is never between them a perfect union. The Serosity is always acrid, and whatever substance, therefore, it is mixed with, it must communicate that acrimony to; but the coagulable lymph, separated from the Serosity, retains no such property. Again, when we coagulate the Serum, we find
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the Serosity run out from the pores of the coagulable lymph, which shews that it was only entangled in the same manner as the fluid volatile alkali coagulates with spirit of wine. From this view we would be led to imagine, that the three parts of the blood are never joined by proper mixture, but only kept in union by motion and agitation. If this be confirmed by useful purposes deduced, as thence accruing to the animal œconomy, it will appear more certain. The Serosity seems designed to take off the putrid parts of the blood, and to furnish the excrementitious secretions. If a proper mixture should take place, it would take off the nutritious coagulable lymph along with it, which we could not conceive to be separated by the secretory organs. Again, the Serosity seems to hold any occasional matters which may exist in the blood, and which, by this means, are soon carried off by the secretions, but otherwise would alter the nature of the animal fluids. This shews that matters, introduced into the mass of blood, can have little effect in altering it, but may be, as they actually are, soon discovered in the secretion.

There is a portion of matter pretty constantly present in the blood, *viz.* the oil which must have been secreted from the common mass into the cellular texture and reabsorbed. How this exists in the blood is not determined; whether united with all the other parts of the blood before-mentioned, and separated by the secretory organ; whether formally as well as materially present; or whether joined with the serosity. It is this last opinion I am apt to favour, for we find often the oil formally present in the urine; we find, that in a due quantity the oil will act as a demulcent, and will take off, *e. g.* the acrimony of the mucus in the bronchiæ, whence we would be led to conclude, that it is designed by nature to obviate the acrimony of the serosity. Wherever there is a tendency to putrefaction, there the acrimony of the serosity is encreased, and there consequently would be more occasion for the oil as a demulcent. Accordingly we find, that in ninety-nine Fevers of an hundred there is an emaciation and an absorption of the oil in the cellular membrane.

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May we then conclude, that those we have mentioned are the only constituent parts of the blood, or are there still others? It has been supposed by Haller, Gaubius, and Senac, that there is a *mucous matter* similar to the vegetable mucus; and the latter also supposes what he calls a *gelatinous matter*. It will be proper to take notice of their arguments. We are daily taking in a quantity of vegetable aliment, which furnishes a vegetable mucus, which may pass through the *primæ viæ* unchanged, and exist in the mass of blood. Indeed this seems to be the case; but then this mucus floats in the serosity without furnishing any nutritious fluid, and so is thrown out of the body. By these Gentlemen it has been said to furnish the mucous secretions. If you look into Dr. Fordyce's *Treatise de Catarrho*, you will find the secreted mucus has a great resemblance to the coagulable lymph, from some experiments, which indeed were made with a view to this very question; a portion only of the serosity being mixed along with it; and indeed every view of this subject seems to confirm what is shewn by these experiments. As a foundation, indeed, for his opinion, Senac alledged, that the mucus is present in the mass with the same qualities as secreted. He took a stomach, and emulged from it a considerable quantity of mucus, more, he says, than could be contained in the follicles, and which, therefore, he concludes must have been drawn directly from the blood. But who determined for Senac the capacity of the follicles of the stomach, or shewed him, that, though that was not great, it might not be compensated by their number? Again, in any irritation applied to the excretories, the mucus runs out in a fluid state, and it is only in consequence of stagnation, that it attains its viscid consistence. Hence, then, we are led to think, that any mucus Senac obtained from a dead animal, was only in consequence of its having stagnated in the follicles of the stomach. Besides, Senac always supposes the mucous matter to exist formerly in the mass of blood, whereas it is much more probable that it is changed in the secretory organs.

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As to the *gelatinous matter*, it may be more shortly discussed. Senac only infers the presence of this matter, from the nature of animal solids, which are made up of the fluids, and are resolved into a jelly different from the coagulable lymph, which jelly he concludes thence must exist in the blood. But we never can perfectly extract animal solids; nay, as in the case of vegetables, there is always a successive solution and decomposition, as will appear sufficiently evident from the experiments of the Bologna Society, and of Geoffroy; so that still we may admit that animal solids are composed of the coagulable lymph, although by reason of the decomposition which ensues, we cannot extract it.

Having thus ascertained the *constituent parts* of our blood, it would be of advantage to determine the *proportion*. This, however, cannot well be done. Although only diffused or entangled, it is very difficult to disjoin the parts of the blood, the serosity entangling and being entangled in the coagulable lymph, and that again concreting with the red globules; and although these parts may be separated, yet never can the separation be made with that accuracy sufficient to determine the proportion. Haller, when he examines the quantity of cruor, has no notion of its entangling the serosity; and, in short, all the experiments which have been made before it was known of what parts the proportion was to be assigned, must go for nothing. *En gros*, the red globules seem to be in smallest proportion, and the serosity in greater than the coagulable lymph.

Here, then, we must consider the changes the blood is apt to undergo, by spontaneous or artificial separation. Nothing is more common than to judge of diseases by the appearance and separation of the blood; but when we consider the variety of circumstances which influence this separation, the size of the orifice, the manner in which the blood flows, the shape and capacity of the vessel which receives it, the temperature of the air at the time, the air in which the blood is allowed to stagnate, &c. we must easily see that

our judgment must be very fallacious, when which of these different causes affects the separation at the time, is so difficult to ascertain. Brown Langrish has made many experiments to determine the judgment to be formed of diseases from the appearance of the blood; but as he could not, and certainly did not, beware of the causes, which varied the blood's appearance, I maintain his experiments must go for nothing. May we not also suppose, that the blood in the vessels is affected with very small changes, while the real nature and condition of the fluids is not altered? Senac gives us an instance of blood flowingropy from the vein, without its appearing that the patient laboured under any disease. Again, a ligature kept on a vessel for some time, will produce that inflammatory crust, which has always been considered as a morbid state of the blood. I had a patient affected with an Epilepsy, who had been accustomed to have blood drawn before the fit, at which time it appeared of the natural condition, but in an hour after, in the time of the fit, the blood drawn concreted without any spontaneous separation. Upon the whole, it will appear, that our judgment, with regard to the state of the fluids, is at present upon a very uncertain footing.

I have said, the Serosity is a watery fluid, and therefore not apt to concrete, especially on account of the saline matters dissolved in it. The red globules shew no concreting disposition, and it is therefore only the coagulable lymph, which, in its own nature, is ready to concrete. It will be therefore next curious to enquire, what are the means in the living body which prevent this concretion, and allow its passage through the minutest vessels. 1. From the view of the proportion, we may perceive that the diffusion of the more fluid parts will prevent the concretion of the rest. 2. Whatever preserves the mixture, preserves the fluidity. This preservation will then depend on agitation, and the action of the vessels. How much these take place, appears from experiments out of the body. If blood is kept in constant agitation, even below the animal heat, the fluidity will be preserved. 3. We must take in, as a preventer of concretion, the degree of heat in animal bodies, which, with a certain

certain degree of motion, and close vessels, always take place in the animal œconomy. Here we would be apt to rest in explaining the fluidity in the mass of blood, but I am sorry to say it, still upon imperfect foundation. If we agitate vehemently blood in close vessels, the coagulable lymph is separated, and the other parts may be poured out from it. This coagulation even takes place in animal bodies, even when life and the natural heat subsists. We constantly find it in aneurismal sacs, and often taking place in the heart, under the name of *polypus*. However, I am apt to think these *polypi* do not so often take place in living healthy bodies as is imagined, but are formed in the agonies of death, or immediately after it. Still, however, there are instances of their continuing for a length of time; *i. e.* instances where all the circumstances we mentioned as preserving the fluidity take place, and yet a concretion obtains. This is very difficult to explain. Perhaps this may illustrate it. It is a curious fact in chemistry, that when two bodies are joined by solution, or diffusion, more particularly by the first, as in a saturated solution of salt, the crystallization will not take place, except where there is a contact with some third body, *viz.* the air, body, bottom, or sides of the vessel. Thus we see that if a dry body is put into the blood, a considerable concretion will be formed upon it, as in the whisking of the blood with rods. Hence we are furnished, besides ligatures, with another means of stopping hæmorrhage, and it is by furnishing an opportunity to this concretion, that *charpie* acts, and probably agaric, whose fine fibrous texture gives an occasion to the separation; for which reason, I imagine the scrapings of a hat would answer the same purpose. This same fact bears a curious application, and seems probably to be the reason of the separation of saline matters and air from water, upon filtration through sand.

But to proceed; this concretion does not take place in our vessels because there is never a dry body in contact with them, a thin fluid, oozing out from their side, continually moistening them, of the same nature perhaps as the serosity, and repelling the particles of the blood.

blood. But why does not the coagulable lymph concrete to the sides of vessels applied to receive the blood? Because, probably, the heat preserves the fluidity for a little, and the serosity gets itself interposed; but wherever there is a dry contact the concretion takes place. This dryness happens in the vessels, as in the case of Inflammation, and probably also in aneurismal sacs; and hence it is that I imagine, where *polypi* are found they are owing to a previous Inflammation. All this, however, is not sufficient. Other concretions take place, and I suspect, that a violent agitation, produced in a particular portion of the blood, may produce them. Hence, then, concretion is not a consequence of the ordinary circulation, because there the powers are so directed as to preserve the proper mixture and proper fluidity; whereas, in the agitation of a particular part of the blood, I conceive the serum taking hold of the red globules, and allowing the lymph to concrete. But even in the progressive motion, it is possible the agitation may go so far as to give occasion to the concretion of the said lymphatic part. In a healthy person, this does not take place, and the coagulable lymph does not separate from the red globules, but when violently agitated by inflammation the lymph gets up to the surface and concretes by itself. This inflammatory crust is no new matter generated by the inflammation, as some have imagined, nor is it then present in greater quantity. No experiments have been adduced to confirm these opinions. I have said, that it was very difficult to assign the proportions of our blood, and therefore this question ought properly to remain in doubt, as belonging to that head. In spite of this, I believe we may take upon us to determine; for when this inflammatory crust is seen, the *crassamentum* is in less quantity and not so firm. Neither, indeed, can we conceive in what manner such new matter can be generated. If a ligature produce the same appearance, we cannot imagine it arises from any change of aliment. As the serosity is furnished by the coagulable lymph, and as we know so little of the red globules, we cannot suppose, or at least explain any change in the latter part, which should convert it into coagulable lymph, or in order to the same purpose, any retrograde change in the serosity. It
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may here be asked, whether or not this crust is encreased in density? This I would deny; for in its spontaneous separation it never appears of greater density, than when procured in the ordinary way. Nay, the force of cohesion in the particles of the coagulable lymph seems rather diminished, which gave occasion to the separation. In putrid Fevers, and scorbutic cases, this crust is very frequent, and there, as in other cases, depends on some change of the lymph, which causes an easy separation. The appearance of this crust is commonly, and may be taken as a sign of inflammation; but it is by no means an universal one; for in healthy persons it will remain for a length of time, as, *e. g.* in the case of child-bearing women. In Fevers, where there is no topical inflammation, the crust has commonly been supposed an indication of inflammatory diathesis, and of blood letting. I would allow this, in so far as we allowed the inflammatory crust as a sign of inflammation. Formerly I used to employ this appearance as a mark, whether a Fever was nervous or inflammatory; and, indeed, it often answers; but now I find that it is not a constant mark, and that the Fevers, in which it appears, would often be the worse for having the evacuation pushed, and were of the nervous or putrid kind.

Having now spoken of the consistence of our fluids in health, we proceed to consider their morbid variations, with regard to the two heads marked out in the Catalogue, of *Attenuants* and *Inspissants*.

When we consider the subtile vessels, through which the circulation is to be made, we would think, that only a fluid of extreme exility was fit for it; but we find that our fluids, which are far from being of a perfect disposition, are capable even of filtrating along the sides of the simple fibres, through pores inconceivably small. There is, then, adapted to each animal a certain degree of fluidity, which must be placed as a standard, from which deviations on either side may be produced. Where the consistence is thicker than the natural, we call it *lentos*, where thinner, no technical term has been applied.

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Proper consistence seems to depend, first, on the due proportion of the parts; secondly, on these parts being kept accurately diffused together; thirdly, on the due force of cohesion in the constituent parts to each other.

1. *Due proportion of the several parts.* In order to produce lentor, we should conceive this chiefly to arise from an over-proportion of coagulable lymph arising; 1. from a large proportion of aliments, or convertible parts, thrown into bodies of strong and rigid solids, we might suppose this encreased quantity of coagulable lymph to take place; and, in fact, different proportions seem to be in different animals, and if we examine them in gross, we shall find, that the density of the blood is in proportion to the strength and vigour of the solids, and therefore in proportion to the different age and sex, and these being given, to the different temperament with regard to rigidity, &c. but, as arising from these causes, lentor will seldom be a disease. Rigid and robust solids require a strong and dense blood as a balance, nor indeed do I think it ever probable, that the natural powers can produce a disease. We may indeed see, that the coagulable lymph is in greater proportion where there are dense solids, but then the greater action of these solids will prevent its concretion. Again, wherever the coagulable lymph is encreased, it has the power of inviscating the other parts, of preventing the secretions, and thus obviating the effects of lentor. Although, however, we should allow, that an encrease of animal nourishment in weak persons may produce an encrease of coagulable lymph, yet even here the consistence will not be much varied, for it will be counterbalanced by increased putrefaction lessening the cohesion. The same effect will be produced, if at any time the secretions be diminished; for then the saline parts will grow still more and more putrid, and occasion an immediate fluidity of the whole. Farther, an over-proportion of coagulable lymph is always accompanied with thirst, by which means a greater quantity of fluid will be thrown in to obviate the density. Upon the whole, there is little reason to suppose the animal powers can produce lentor from encreasing coagulable lymph,
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nor indeed do we know any matter which particularly furnishes coagulable lymph, or that it can be procured by any means, but from our aliment.

What next will vary the consistence, is the proportion of serum. This may take place, either from too great an abstraction, or from its being kept back. With regard to the last, as the diminution of drink diminishes all the fluid secretions, its want is compensated. It may act also in another way. The fluid accompanying our aliment promotes its solution: The less of this, therefore, we take in, more faeces are produced, and consequently less coagulable lymph is carried into the blood, so that in either way, no encrease of the blood's density is produced. I think this is confirmed by experience. I know many persons, especially those of the female sex, who take exceedingly little drink, and yet their blood is not more dense than that of other people; and the same thing I have found to take place with myself, and, therefore, I think persons, in this respect, may be allowed their own choice, without suspicion of any bad consequences, except what may arise from the vigour of the solids. Another counterpoise to the keeping back of fluid parts is, that the fluid secretions are diminished, as the urine and perspiration; from which retention of the saline parts, a putrescency takes place, which compensates entirely the effect of the diminution of drink on the consistence. Next, with regard to the abstraction of the fluid parts. In the living body there is no halitus, but this is made up by secretion. Nothing is more talked of by Physicians, than by the dissipation of the more fluid parts, an inspissation of the rest; and yet I am of opinion, it very seldom takes place. The most considerable fluid secretion is that of urine, not, indeed, greater than perspiration, but more considerable, as made from a smaller portion of blood. Let us suppose 5j. of blood goes through them * at every pulsation of the heart, which let us suppose sixty-four times in a minute, then

* The kidneys.

will ℥viii. of blood pass through the kidneys in a minute, which is a very moderate calculation, considering the proximity of the emulgers to the heart, and xxx℥. in an hour. From this quantity let us suppose ℥iv. of urine in an hour to be separated, which is a great proportion, making vi℥. a day, then will the whole quantity secreted be only an hundred and twentieth part of the blood which secreted it, which can very little alter the consistence. When such is the case in the secretion of urine, where so much is taken from so little blood, much more will it take place in other more diffused secretions. But when are the secretions encreased? When there is a considerable quantity of fluid taken in. Again, when the secretions are encreased, the encrease of one is always followed by the diminution of another, and the body becomes in an absorbent state, and attracts moisture from the air. Again, encreased secretion is always followed by thirst, and then a supply of fluid is thrown in, or, if we are prevented from drink for any length of time, it never misses to diminish the secretions. Hence, then, dissipation of the fluid parts can have little effect in producing lentor.

The second cause of Lentor may be assigned *Defect of Motion*, or the moving power. To this purpose it may be observed, in the first place, that if blood be received and kept in close vessels, it retains as much fluidity as is consistent with the cold to which it is exposed, so that without exhalation, the fluidity is not much altered, and accordingly in the smaller vessels of a dead body the whole was fluid almost as in the living. Sometimes, indeed, in the larger vessels we do find coagula, but these are owing to particular causes, *e. g.* agitations in a particular part, or the agonies of death. In fact, we have not much to suspect from small stagnation, unless some other circumstances concur to favour some secretion; or if concretion should take place, fluidity is soon restored by the action of the containing vessels, as in persons recovered from a long syncope. This is most remarkable in the sleeping animals, whose fluids actually concrete during the winter, and are restored to fluidity

fluidity by the vernal warmth exciting the action of the vessels. Van Swieten clearly shows, that in a bat's wing, which he examined, the first change was produced in the solids, and that the grume accompanied their motion till it was totally dissolved. Formerly we imagined, that when fluids were concreted beyond the vessels, as in Cancers and Scirrhoties, that the disease was incurable; but late experience has happily shown this to be a mistake, and awakes our remembrance to other facts of the same kind, long ago alledged. Such are the provisions we see afforded by the animal œconomy, in order to avoid disease, insomuch that hope need not fail us while life remains. Even when the blood stagnates in such a manner as to favour concretion, as in Ecchymoses, false Aneurisms, &c. we see there are undoubtedly some powers in the animal œconomy, which restore fluidity, and cause absorption.

The third cause of Lantor may be *an increased Force of Cohesion* in the coagulable lymph, or in any other part of our blood. This may arise, first, from the nature of the fluids themselves; or, secondly, coagulable substances applied; or, thirdly, coagulating powers, as cold. The first may take place in consequence of difference of aliment, and vigour of the assimilatory powers; but in so far as increased cohesion arises from these, it is never a disease, for it is always in proportion to the strength of the solids. But aliment may be considered in another light, according to its perspirability; *e. g.* Oysters are more unperspirable than mutton, which is explained from their greater viscosity in the blood. How far this may go on in producing a viscosity of the whole mass is uncertain. If the same aliment be not continued, the effect is soon over; if the aliment is continued for a length of time, a disease indeed is produced, but then the retained perspiration obviates the viscosity, which would be apt to occur, by causing putrefaction; and therefore it is a Scurvy, and not a Lantor, which we must apprehend from too viscid aliment.

The second means of encreasing cohesion was, by coagulating substances introduced into the blood. These Boerhaave enumerates in his *Coagulum acidum spirituosum et austerum*, under the last comprehending Metallic Salts, &c. All these, when diluted, lose their coagulating property, and without dilution they cannot enter into our blood. They can only be given in small quantity at a time, that must be diluted before it pass our fauces, is diluted in every step of its progress through the alimentary canal, carried into the lacteals is diluted with the lymph reflux from every part of the system, entering the subclavian is diluted by the blood, and is thrown out from the left ventricle, diffused through all the fluids of the body. It is plain, then, in such dilution and diffusion, the sensible effects of coagulating substances introduced by the mouth cannot be perceived. Injected, indeed, into the veins, they will exert their effects, but then this is not to be considered as a disease, and, in fact, is entirely incompatible with life. Dr. Boerhaave adds an instance of the effects of Gypsum, which needs no animadversion here. Coagulum, then, in our fluid, from coagulating substances, can never take place in the living body.

The third means of encreasing cohesion mentioned, was by coagulating powers applied, *i. e.* Cold or Heat. Why such opposite degrees of the same power should have such similar effects, it is not our business here to enquire. The coagulating effects of neither of these on our fluids can take place in the living body. Cold cannot coagulate the fluids till it has destroyed the action of the moving fibres, and the mobility of the nervous power, to which all its effects are to be imputed. On the other hand, coagulating heat can never take place till it has destroyed the whole system, or the peculiar part to which it is applied, and it is only in consequence of restoring the action of that part, that fluidity can be restored. From these considerations it will appear, that though we cannot absolutely deny such effect upon the fluids, yet that it occurs much more rarely than was imagined, and that, when it does, it is not much to be regarded.

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Although not strictly connected with this subject of *Lentor*, I cannot help taking notice, that Obstruction has been considered as an universal cause of disease. Obstruction may depend either on the thickened consistence of the fluids, or the straitening of the vessels. This last is what I imagine to be most frequent, and from what we have said, I think, it will appear that from the first cause it very rarely occurs. For this subject I refer you to Haller, who alledges, in consequence of direct observation, that Obstruction at all very seldom takes place, and who denies absolutely the principal species of it alledged, the *error loci*. In short, it is proved, that Obstruction without Irritation, is of little consequence in the system. All this applies to the whole pathology of the fluids.

Before I leave this subject, of the Consistence of our Fluids, I cannot help speaking of the *phlegma calidum et frigidum* of the ancients, which, indeed, some of the moderns have endeavoured to support. By the first is meant constantly Inflammatory Lentor, so that it is plain here, a natural portion of our blood has been mistaken for a morbid one. If the coagulable lymph thus be the cause of the *phlegma calidum*, I deny absolutely that any such thing as *pituita frigida* takes place, beyond the *primæ viæ* at least. Boerhaave has given us many instances of *glutinosum spontaneum*, but you will find they all occur in consequence of secretion, and stagnation out of the course of circulation, and do not infer the existence of any such matter in the mass of blood.

Lentor, then, it seems to be proved, occurs very seldom; but at present let us suppose it possible, and consider these medicines which may obviate its production, or remove it when produced, *viz.* the

A T T E N U A N T I A.

These by some have been distinguished from Resolvents, and such do not extend the meaning of *Attenuantia*, as we do to medicines which diminish viscosity in general, but confine it to
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such medicines as dilute thickened fluids; whereas they say, that Resolvents restore fluidity to a portion of our fluids by any means concreted. These last I would deny the existence of, as none such can have effect in the living body. There are, indeed, resolving powers, but such are not resolvent in consequence of application to the concretion, but in consequence of action on the moving fibres.

However, as I am not certain whether I can deny these altogether, I have set down in our list such as are supposed to have these properties. Attenuants may be of two kinds; 1. Acting by increasing the proportion of fluid parts; 2. By diminishing the cohesion of the parts of the blood. Of the first kind are only Water and watery liquors.

W A T E R.

Of this I am only to talk of the internal use. Externally, cold Water proves a stimulus to the moving fibres, and in the same manner acts internally in the stomach, overcomes the *plethora quoad vires*, removes that load which an oppressed stomach gives to the system, promotes digestion, promotes evacuation of the fæces. It is in this way only we can explain a common application of it. Chocolate is a very viscid aliment, and apt to stay long upon the stomach; but if the use of it be followed with a draught of cold Water, it is easily digested. The efficacy of cold Water on the stomach diffused over the system, causes a determination to the surface of the body; and indeed there is no means more effectual in procuring a sweat, than a large draught of cold Water. This I cannot explain, but may illustrate it by the effects of the saline draught, which has the same effect. Cold Water, too, will answer in relieving Vomiting, wherever the saline draught is effectual, when vomiting depends on want of determination to the surface of the body. The ancients employed cold Water to relieve the vomiting in Intermittent Fevers; and the southern nations still use it for the same purpose. Cold Water has likewise been employed in continued Fevers. The use of it here you must study in Lommius, and
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the ancients, and in the writings of the Physicians of Italy and Spain, who not only use cold Water, but Ice Water, and have bestowed whole volumes on the subject. As among the ancients disputes arose, whether hot or cold water should be employed at different times, so these disputes still subsist. What are the limits I cannot determine, from want of experience, and perhaps also, from not having consulted with sufficient accuracy the authors I have mentioned. Here is, however, one decision which I can offer, *viz.* that in inflammatory Fevers, more especially those attended with topical inflammation, as Angina, Pleurisy, &c. cold Water has often bad effects; but again, is useful in Fevers of the malignant, nervous, and putrid kind. In the northern countries our Fevers are more of the inflammatory kind, and therefore cold Water is not so commonly used; but perhaps not merely from the difference of the disease, but also from the Cartesian theory, by which the use of warm Water was introduced along with the notion of *lentos*. However, there are certainly exceptions to this. We every day see the country people employ it with impunity, with advantage*, often exciting a sweat, which produces a solution of the Fever. These are the effects of cold Water in the stomach, and in consequence on the system. One, however, still remains, whence cold Water is thrown into oily matters, or where oil is diffused, as in emulsion, it immediately curdles it, and does not allow the proper diffusion. Something of the same kind seems to occur in the stomach. I myself was once troubled with weakness of the stomach, insomuch that oil would not stay upon it, but flowed near the upper orifice, and was thrown up in pure oily inflammable eructations. Now when this is gone, I find, upon a draught of cold Water, the oil will separate as before, which can be explained on no other foundation, but that oil does not unite even with mucilaginous matter without triture, but is thus separated by the cold Water.

* This holds true, particularly in Autumnal Fevers, of which the poor are often by this means cured, while the rich go on in their disease.

As a diluent and solvent, the advantage is entirely on the side of warm Water, which proves a stimulus to the stomach, and by expediting solution, mixture, and evacuation of the stomach, favours digestion very much, and hence we must deduce the effects of Tea and Coffee for the same purpose after a full meal. But with these effects it produces a relaxation of the stomach, whose tone is in common to the whole of the system, and weakened, produces a tremor, extending the relaxation and heat over the whole surface of the body, and producing diaphoresis and sweat. In inflammatory Fevers, then, and inflammatory Diathesis, warm Water is very proper in these intentions; but in weak, lax, and flaccid habits is pernicious. Hence in the same persons, besides the ingredients themselves, we may see the bad effects of Tea and Coffee may also arise from the warm Water.

In the milder aromatics, with moderate restriction, we should see the same effects of Tea in promoting digestion, without their relaxing debilitating qualities. These are the effects of cold and warm Water in the stomach, except what regards their emetic property, which properly comes under that head.

Carried from the stomach into the intestines, their effects are entirely the same, because when they have arrived there, the hot or cold Water has gained equally the temperature of the body. The effects of cold water in the stomach may be propagated by consent into the intestines, but as taken down and materially present there, it differs nothing from warm Water. In the intestines, Water promotes solution, dilutes the chyle, and the viscid stuff contained in them, and washes off the mucus adhering to their internal surface; by giving greater fluidity of their contents will favour absorption, and by encreasing their bulk the progress downwards, insomuch as sometimes even to prevent its own absorption. Given in considerable quantity, as in that of a Scots pint, by its bulk it will so much encrease the peristaltic motion, as to become purgative. This only can explain the purgative effect of some Mineral Waters, which often
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are so, merely on account of the dilution in which their saline matters are held, and whose effects can be encreased by encreasing the dilution. Thus ℥j. or ℥ij. of Mineral Water in which ʒij. of Glauber's Salt is dissolved, will prove more powerfully purgative, than ℥ss. in which ʒj. is dissolved. I am persuaded, it is a mistake to limit the dose of our Mineral Waters of this kind, for we see the common people, who pour them down in large quantities, obtain their effects more remarkably, both with respect to their purgative as well as other properties. Certainly this of Water is one of the safest purgatives, acting merely by its bulk, without stimulating, inflammatory, or sedative weakening powers. Absorbed into the lacteals, Water must dilute the chyle and favour its mixture with the lymph; but its effects are much more considerable in washing out the mesenteric glands, that important part of the lacteal system. The Scrophula is now found to be a disease of the lymph, and often to affect the mesenteric glands, which Water will not only wash out, but encrease the action of their vessels. Mineral Water and Salt Water are most noted for their effects in this disease, and, considering the weakness of their impregnation, and the great variety occurring in that where the effects have been found the same, we have great reason to suspect that a considerable part of their virtue is to be imputed to Water. To this purpose I shall give you a fact. I am ready to believe, with Russel, that Sea Water cures more effectually than Mineral Water; but then from its impregnation it proves so purgative, that thence its dose is much limited. My practice is, both with children and adults, to join an equal quantity of Common to the Sea Water, and I find remarkable good effects from the addition. All this seems to prove the action of the Water here to be that of washing out the lymphatic system.

Carried into the blood-vessels, Water expedites the freedom of the circulation, and promotes a more free secretion; but here there is no danger from its quantity, for it is soon thrown out by the secretions it promotes. It increases the motion of the vessels, while at the same time it opens those of the extremities to give way to the in-

creased impetus. It is one of the safest Stimuli, and, by diluting the saline and putrescent matters in our fluids, checks their intestine motion. By one and the other effect, it expedes every secretion, as has been mentioned, but more especially the excrementitious secretions of sweat and urine. By expeding these, it washes acrimony from the coagulable lymph, and discharges that acrimony out of the system. By diluting the coagulable lymph, it seems to facilitate its application to subtiler parts, or its filtration along our simple fibres. It is a certain fact, that calves, *e. g.* are much more nourished by an equal quantity of milk and water, than by milk alone, which can only be explained from the water producing more easy application. We thus consider the effects of Water on every part of the system, and upon the whole, the use of it in diseases. We shall, in some measure, be ready to allow, with Hoffman, that the title of *Panacea* more properly belongs to it, than to most other medicines.

If any of the following substances be attenuant at all, it is from diminishing the cohesion of the parts of our blood.

A L K A L I N A.

The title is set down as comprehending the substances marked at *b*, in column of *Antacida*. We must here invert the order in which they are set down.

Volatile Alkali. This, from its stimulus, can be given only in such small quantity at a time, that its attenuant powers cannot be observed. Its operation is probably confined to the stomach, as a Stimulant and Antispasmodic.

Vegetable and fossile Alkali. Between these there is no difference in medical properties. In their mild state they have no effects, as attenuant in the mass of blood. Out of the body, in that condition, they do not affect the coagulable lymph; *à fortiori*, not in the system. In their caustic state, out of the body, they do act upon the blood,

blood, and that very quickly, but all the difficulties we mentioned about the effect of substances on the blood, take place here; and to these an additional one is, that in passing the stomach, they will always meet with an acid; and surely, with these disadvantages, and diffused in xij lb. of serosity, they can make little change in the mass of blood, in any quantity in which we can introduce them. Concentrated, however, in the secretions, their attenuant effects must be more considerable. Here we should also take notice of their resolvent property, but first shall mention

Q U I C K - L I M E.

This must necessarily be given thus caustic, in order to have any effect on our fluids. It dissolves the coagulable lymph, and may be thrown in in greater proportion than alkali, but never can be given in such large quantity as to have any considerable action as attenuant. Besides, it is used as a medicine, to obviate acidity, a proof that it is neutralized in the stomach; from all which, with the alkali, it may be considered as exerting only its power in the kidneys. Both this and Alkali have been said to dissolve stones. *A priori*, we should certainly deny this; *a posteriori*, we are very certain that in many cases they do not. Du Haen gives us an instance of fifteen hundred weight of quick-lime being taken, besides many pounds of soap, and all without any sensible action on the stone. Lime-water, however, on the other hand, has been said as undoubtedly to dissolve stones, and calculous concretions of the kidneys, but then these are of exceeding great variety, and in some the solution may be obtained. I think I have seen such, where the urine was turbid, with greater quantity of sandy matter, and matter of a flaky appearance. Here, however, there might be a deception, and a slight change of urine might have had the effect; and indeed we must allow, that many more experiments are wanted, and better directed observations. In many instances the pain and strangury are relieved where there is no solution; and indeed if we allow that the *Uva Ursi* can operate without that effect, we may admit that Lime-water and Alkali may operate in the same manner. Again

we are liable to another fallacy. We argue for the power of Lime-water dissolving the stone, because the urine of those who use it will dissolve the stone out of the body, but still we are not sure that this is owing to the impregnation received from the Lime-water, for the urine at this time contains a volatile Alkali, so that we must not determine till we have tried the urine of the same person with or without the remedies. Besides these, we are exposed to many other fallacies ; so that, on the whole, we must not determine till experiments be repeated with a view to say any thing certain on this subject.

S A L E S N E U T R I.

These have no sensible effect on the coagulable lymph out of the body, and how they should have it in the body I cannot imagine, both on this account, and the small quantity in which we can exhibit them. In one view, however, they seem to be effectual in preserving, if not in obtaining the fluidity of our blood. Our blood is, in great measure, kept fluid by the serosity, and this property it seems to possess, as water impregnated with saline matters, for common water will not have the effect. This would make us believe, that some neutrals added, and also Alkalies, would increase the effect ; but still I can allow little to it, merely from considering the small quantity in which they can be thrown in. If thrown in in a large quantity they will vomit, so that we are forced to take them at several times, insomuch that one will be acting on the kidneys, while the other is throwing in. The most which we can suppose of Nitre, *e. g.* taken into the blood, is $\frac{3}{4}$ ss. and yet this diffused in xij ss. of serosity, scarce gives any sensible taste, scarcely any sensible action. Of their effects we shall talk afterwards.

S A P O N E S.

Here I mean to talk of the combination of Expressed Oil and Alkali. This manifestly relaxes the texture of the coagulable lymph, and may be taken in quantity, and then only preserve the fluidity of the whole. I have known lately a gentleman who took it

it in about the quantity of ℥iij. a day, with whom it came off by urine. Its effects in the Gravel are not certain. We should examine the state of the soap when discharged by urine, and endeavour to find whether its oil be separated, so that the alkali has now become more powerful.

Our list of Attenuants, you see, is very small. The others mentioned under this head by *Materia Medica* writers have been introduced from inference, because found useful in what is called viscosity of the blood and *pituita frigida*, but we have already occasion to show that the action of these was on the solids. Dr. Alston, in making up this list of Attenuants, gives properly those which we have mentioned, and afterwards adds a great many from his list of Stimulants. With regard to these no body has spoke precisely. If they be said to be attenuant from acting on the fluids, I deny that any experiment shows it. If they are said to be attenuant from acting on the solids, it possibly may be so; but I know no man who has determined that degree of their action necessary to give fluidity.

We now come to speak of the general titles.

Dulcia. These, at the place referred to, have been constantly mentioned as of a saponaceous nature; but from what has been said, their effects must be very ambiguous. As the foundation, however, of the *Nutrientia*, they may be of some avail.

Nutrientia. In so far as vegetable aliment gives less nourishment, it gives less coagulable lymph, and consequently on this account, and as accompanied with a good deal of fluid matter, fluidity to our blood. But I do not know how far this can be carried, for the density of the blood depends very much on the state of the œconomy with regard to the solids. Thus a robust laborious man, who lives on vegetables, will have denser blood than a fine gentleman, who lives on animal food. Again, vegetables, as
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less putrescent, may remain longer in a viscid state before they are converted ; and it is for this reason that they are given in the Scurvy, where density and consistence is wanting.

Emollientia. Vegetables of this class, as marked in the Catalogue, were supposed to abound in the saline matter, but this is not in any such quantity as to give them any title to a place here.

I N S P I S S A N T I A,

Under the head of *Attenuantia* we have considered how far Lensor may take place. We are now to consider the deviation of the fluids towards the side of too great fluidity. This change must depend on an over-proportion of fluid aliment, or a diminution in the force of cohesion of our fluids. A defect of motion was speciously enough alledged to be the cause of Lensor, so that an encreased motion might be reckoned the cause of fluidity ; but while the proportion of the parts remain, great motion will not alter it. Fluidity, then, depends chiefly on the proportion, which may be varied in two ways, either by the introduction of a great proportion of fluid aliment, or by the retention of the secretions.

1. As to the over-proportion of fluid aliment ; if this be perfectly mild, we have mentioned the salutary effects that may arise from it, as that of encreasing the secretions, by which means the over-proportion would run off. It has been alledged, that, instead of being carried out of the body, water may run off into the cellular membrane, and produce Anasarca or Ascites. From observation I never saw a Dropsy arising from this cause. Universally it depends on a considerable resistance made to the return of the venous blood, or a defect of absorption. Hence I would doubt whether ever an over-proportion of fluid aliment could produce disease. An over-proportion of warm liquors may certainly be hurtful, but then we must ascribe this to the relaxation they induce in the stomach, and consequently over the whole system.

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As to the retention of the secretions. If we could suppose this to take place over the whole system, the effect would certainly follow, but this we cannot expect; and if the retention is only partial, it will always be compensated by the encrease of other secretions.

A faulty proportion may occur from a defect of solid parts, by abstracting nourishment altogether, or to a defect of assimilation. As to the first, it is doubtful how far fluidity may arise from this cause, considering how fruitful the animal œconomy is in making provision against any such changes. A blood once provided with a due proportion of coagulable lymph is only liable to lose it by putrefaction, and it is of this that those die who die for want of food. More to be attended to is what we mentioned last, *viz.* when the digestive and assimilatory powers are too weak to convert aliment into proper juice. I am ready to believe this may happen; but the formation of our blood, the effects of motion, &c. are so little known, *e. g.* whether it would produce viscosity or fluidity, or whether there be not provisions to obviate these, that we cannot yet speak positively on the subject. In one other way our fluid may be varied on the side of fluidity, by the more dense parts being evacuated. Such effect might be supposed to take place in hæmorrhage, but here it is uncertain whether the hæmorrhage operates by abstracting the dense parts, or by retaining the secretions, and so occasioning fluidity.

2. With regard to the production of fluidity by the diminished force of cohesion in our fluids. Whatever is owing to the weaker action of the digestive powers must depend on these not giving sufficient strength to the whole, but this diminished force, from what has been said, will depend on defect of mixture when the fluids tend too far to putrefaction.

From whatever sources this of fluidity may proceed, it will appear they are very doubtful, and therefore that the existence of it
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is not so frequent. When it occurs, however, we must next consider how it is to be remedied. This may be affected in two ways; 1. by restoring the due proportion of viscid fluids; 2. by encreasing their force of cohesion. The substances proper for the first indication are marked under the general title, to be mentioned afterwards. As to the second, the only medicines marked for this head are *Acids* and *Alcohol*. These can never be used internally to produce their effect, and therefore are only employed externally in the case of Hæmorrhages. As to the second indication, if we can restore the viscosity of the fluids, it must be by the *Nutrientia*. The Astringents also in some measure belong to the article of Acids.

To the *Nutrientia* we must add a number of Demulcents, which, as they contain a mucilaginous matter, may have the effect of encreasing the viscosity of the mass; but then they float only in the serosity, and are soon carried off with it.

DEMULCENTIA.

These are medicines which correct the acrimony of our fluids. Changes may be made in the mixture of our fluids when no Acrimony takes place, but this is a subtilty not yet established. Medicines correcting acrimony may be of two kinds, as correcting Acrimony in general, or particular Acrimonies. It is the first of these which is properly meant by Demulcents, which act not by changing the nature of the Acrimony, but merely by sheathing or covering it, in imitation of Nature, who has covered our solids with a mucus for the same intention; for it is the same thing whether our solids are wrapped up in this mucus, or whether the fluids are mixed with it. Hence all our Demulcents are mucilaginous, or oily matters, or a mixture of both. It is the serosity which is the vehicle of acrimony, in order that it may be carried off by the secretions. In these acrimony exerts its chief effects, and it is there, too, that our Demulcents are collected, in order to defend the secretory organ. But before this I should have observed, that Demulcents sheath the acrimony,

mony, which in the heart-burn affects the upper orifice of the stomach, have the same effect in the intestines, supplying the natural mucus, as in the case of Dysentery, and also defending the rectum in case of very hard putrid fæces, &c.

In the blood vessels, I do not imagine acrimony takes place, on account of the diffusion, and likewise because the vessels are lubricated and defended from it by a mucus constantly exuding from their sides. It is in the secretions, as we have said, where the acrimony passes in greatest plenty, and exerts most of its effects. Hence in acrid urine, the efficacy of our Demulcents, which, carried along in the same serosity with the acrimony, defends the kidneys from its effects; and hence in this, as well as other diseases of the urinary passages, calculous and nephritic cases, &c. are so very useful. An increased secretion of mucus is always acrid, being poured out from the follicles, before by stagnation it has time to become mild. Thus poured out in the *bronchiæ*, it produces an irritation, creates a violent cough, and affects the lungs. Hence, in almost all diseases of the breast our Demulcents are very effectual in covering the acrimony of the mucus. Fluor albus is nothing more than an increased evacuation of mucus in an acrid state, and hence Demulcents become good palliatives. Nay, sometimes the disease seems to be continued merely from the effects of the acrimony, and in such circumstances I have seen Demulcents operate a perfect cure. Demulcents are also useful in the flux of the lochiæ in women. In every hæmorrhage an acrid serum is poured out, which in this case I have seen so much, so as to excoriate the parts which it passed over; so that universally all hæmorrhages may be continued from the irritation, and so universally our Demulcents useful.

It was formerly a practice, yet continued by some, to give *Spermaceti* to child-bearing women, for which I was at a loss to know the reason; but now see, that in large quantity it might have the demulcent property we mention. After menstruation, I have often known the parts sore, and by this means an uneasy irritation produced,

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duced, only to be removed by Demulcents, externally or internally applied. It has been imagined that Demulcents, in stopping hæmorrhage, acted by inspissating the blood, and hindering it to flow out; but you will easily see, that it is much more probable that their action is by inviscating the acrimony which irritates to hæmorrhage. So much for the effects of Demulcents in general. On particulars we have very few observations to make.

The three first marked in the Catalogue belong to the

ASPERIFOLIÆ.

I do not know whether we can extend the demulcent virtue to the whole tribe. The *Consolida major* contains so much of it in every part of the plant, that it can be prepared into a kind of salep.

Pulmonaria has the ordinary virtues of demulcent. *Cynoglossum* is not solely mucilaginous, but has an acrimony joined with it, which makes it avoided as demulcent. It was formerly called narcotic, but this property is still doubted. Sir John Floyer gave it to a dog, in great quantity, without any poisonous effect. Dr. Hulse, in Ray's *Historia plantarum*, tells us it is of use in the Scrophula. On the other hand, Morison and Blair give us instances of its poisonous property. Blair's, indeed, does not properly apply, as the *Cynoglossum maritimum* is a different plant.

FARINACEÆ.

All these (and indeed all the *Nutrientia* of the vegetable kind) have more or less of demulcent virtue, in proportion as they give out in infusion or decoction a greater quantity of mucilage, and by this we may judge of the propriety of their exhibition, and the largeness of the dose.

DULCIA.

D U L C I A.

It would seem doubtful whether these belonged to this head, but experience shews they are useful, and we give Syrup with good effects in Catarrh. The use of the *Dulcia* may be collected from what we said of them formerly in the *Nutrientia*, and what will be said of them as *Laxatives*. As to the various kinds, how far they distinguish them in practice is doubtful. Fine Sugar is less fermentable than Honey, but that boiled, and deprived of its acid, is neither more detergent, demulcent, or balsamic, than sugar. The fruits are demulcent in proportion to their sweetness.

Liquorice. We cannot employ many of our sweets, because they produce thirst. If it were true that Liquorice had not that inconvenience, it would be of great use, but upon trial, given in the same quantity with the rest, I have found it always to produce the same effects, without any remarkable pectoral virtues.

S I M P L E G U M S.

The first four of these are very useful. I can throw in more mucilage of *Althæa* than any other plant, and so of Gum Arabic, which is commonly employed in too small a dose. I give to the quantity of ʒij. in emulsion, and then only find its proper demulcent effects in the urinary passages, where there is most occasion for it. *Starch* is a vegetable substance, in the state most fit to be employed as a mucilage, and I have known it thrown in internally in the dysentery. Salep should have been set down here. Many of our own plants might afford a similar substance, *e. g.* *Symphytum* and *Althæa*. *Ichthyocolla* is set down as an instance of animal mucilage being employed as well as the vegetable. This is one of the strongest species of animal glues. Wherever there is reason to dread putrefaction, these should not be employed; possibly, however, there may be cases adapted to it. In the *primæ viæ*, where there was acrimony without fever, I have seen it given instead of Starch in glysters, and

with good effects, its difficult diffusibility is the occasion of its rarer use.

The general titles will be easily understood. Sedatives take off the effects of acrimony, by diminishing the sensibility of the part. I have put them down here, because they are often said to be demulcent in the strictest sense. Thus the seeds of *Hyoscyamus* have been supposed the foundation of its demulcent property; but it is plain they never can be given in such quantity as to produce that effect; and thus *Hyoscyamus*, as demulcent, acts merely by its sedative quality.

A N T A C I D A.

Animal bodies are formed, both fluids and solids of them, from the aliment we take in. No portion of these fluids is of any duration in the system, but is constantly washing out, and supplied from the aliment. Vegetable food is the only food of animals whose changes we need properly enquire after, as all animals either live directly upon it, or on animals who do. The acescent matter of vegetables, for it is by that they are chiefly distinguished from animal nature, is converted into animal matter in consequence of powers subsisting in the animal body. Hence, then, vegetable aliment in animal bodies goes through all the steps to putrefaction, which, however, in its highest degree, never takes place in animal bodies. Hence we are led to consider animal fluids in three states; 1. a portion still remaining acescent; 2. a portion in an intermediate state betwixt acescency and putrefaction, or the proper animal fluid; 3. a portion degenerated towards putrefaction. This view leads us to observe the morbid deviations, while, on the one hand, our food retains too much acescency, or, on the other, is gone too far towards putrefaction. These two acrimonies, the acid and alkaline, are the chief, and perhaps the only ones we can distinctly mark. We may, indeed, perceive extraneous acrimonies introduced by foreign means into the body, but into these we cannot, nor is it our business at present to enquire.

quire. How far even in the common mass there may not be a variety of Acrimonies different from those we speak of, I shall not say; but I maintain that no body has explained or shown of what kind they are, in what cases they appear, and with what symptoms they occur, or what symptoms they produce; and. *de non entibus, ac de non operantibus, fere eadem est ratio.* There is yet a more fruitful source of acrimony in the body, viz. from degenerated fluids being absorbed, and acting upon the system. But to know what acrimonies they would produce, we must be acquainted with the state of all the secreted fluids, a knowledge we are very far from having attained. Every one of them which has been lately examined, has turned out different from what it was formerly imagined, and till once we are well acquainted with their nature, it is in vain to speak of the changes to which they are liable; so that, though we allow an infinite variety of acrimony, certainly we ought not to talk of them so confidently as we do. As an apology for this discussion I may observe, that perfection is not to be expected in a system of the theory of Physic, and that it is necessary to point out its errors. I can venture at least to say, that acrimony is often accused without foundation. No sooner do we see a motion excited in the system, than we refer it to stimulus, and that to acrimony; but every motion of the system can be excited independent of these, as in the hysteric disease, &c. by the passions of the mind. This, indeed, may be thought a stimulus, but surely it is neither of the mechanical nor chemical kind. Acrimony, indeed, does exist, but its species can never be precisely determined; nay, when it does exist, we may neglect it. Thus, undoubtedly, in the Small Pox, and other contagious diseases, an acrimony is certainly present; but in the cure it gives us no indication, and we do not regard the acrimony, but the effects it produces. In the same manner, in the case of poisons, we obviate their effects, for we very seldom know the nature of the particular poison. Even when we do know them, it is very seldom we can give medicines to correct them. However, there are a few cases where the indication is to expel the morbid matter; but then
this

this is only in a very general way, and by such medicines as bring a total change on the fluids. Upon the whole, then, you will see, with what impropriety we amuse ourselves with acrimony, seeing we accuse it so often without foundation, talk of it with so little precision, and may neglect it with so much safety. From all this we shall treat only the acid and alkaline, as with these we are best acquainted.

Acid Acrimony takes place when the vegetable aliment retains its acid nature to a morbid degree. In what part of the system does this take place? In the first stage in the *primæ viæ*, and almost only in the stomach itself. Some have supposed it goes into the blood, and there occasions diseases. For my part, I am of a contrary opinion. Even in the intestines an acid has never been found, for it is there covered with fluids. As soon as it comes out of the stomach it is mixed with the bile, and forms with it a composition which is the cause of its effects in the intestines. Much less then can we suppose it in the blood vessels. I doubt even if the chyle is found there, as some alledge, considering the mixture it must undergo in the thoracic duct and in the subclavian. All the chyle seen in these days in the blood is only a portion of the coagulable lymph, separated by itself. Even although we allowed it did take place, in twelve hours it would disappear; for after that time having elapsed from the taking of food, no milk is secreted, so that we cannot conceive it having any effect on the consistence or mixture of our fluids. How far a certain modification in the state of our fluids may take place, I will not say. Vegetable aliment may, indeed, give a less dense blood, but even that was doubted; but supposing it did, it would by no means be acid. Dr. Boerhaave is the chief leader of this doctrine, and, in his *Aphorisms*, talks of an acid milk, &c. produced by it, &c. The very same Boerhaave, in his *Chemistry*, contradicts this opinion, and maintains the contrary against Lemery and Homberg. Nay, he goes to an excess on this subject, and denies an Acid could be extracted from human blood, an experiment successfully repeated

peated since Homberg, &c. by every succeeding Chemist. When Van Swieten was published, I expected to have seen the matter confirmed; but if you look into his Commentary, you will find him talking sceptically upon the subject, and giving no instances to confirm the allegations of Boerhaave. I shall then abstract entirely from the consideration of Acid in the blood vessels, and talk of it only as existing in the stomach. There it may take place on two footings; 1. When the acedent fermentation is of the vinous kind, producing *gas sylvestre*, spasmodic pains, &c. 2. where, though the fermentation is calm, such a quantity of acid may be generated as to produce bad effect, uniting with the bile, and causing Cholera, &c. These may depend on a variety of causes; 1. From an over proportion of acedent aliment, which may leave so much Acid as to prove a ferment for some time afterwards. This cause is much considered, but of a nature easily to be overcome. 2. The fault more commonly lies in a defect of the digestive liquors, as an abstraction of the saliva, &c. 3. More frequently still do these effects proceed from a weak stomach; for by its natural action the aliment is compressed, the air generated in the formation inviscated and reabsorbed. Slow evacuation is another consequence of a weak stomach; and indeed this might have been made a distinct head, as Acidity is always greater in the proportion as the aliment is longer detained; and I have seen no instances of a very strong Acid produced, except where there were scirrhoties of the pylorus, and then it had the effects of mineral acids, eroded linen, &c. Not only is slow evacuation thus hurtful by causing acedency, but also by preventing its passage into the intestines, and being corrected by mixture with the intestinal fluids. From all this it appears, that vegetable aliment must be more acedent, as less soluble. The weaker action of the stomach deserves particular attention, as arising from so many secondary causes, and these depending on the constitution of the system in general, these diseases being seldom a topical affection, and being produced even by passions of the mind, &c. and every increased evacuation of the system. In order, therefore, to a cure, we must eradicate

eradicate these various causes; but our time forbids us now to enter upon such a consideration, and we are only to talk of such medicines as destroy Acidity for the time present.

The medicines set down under the article *Antacida*, are those which destroy Acidity by neutralizing it. These are divided into three classes. The first contains Earths, the second Alkalines, the third Neutrals, under which is comprehended one compound of another kind.

I. E A R T H S.

All the set marked at *a*, are *Absorbents*. They are divided into two fasciculi, the Fossile and Animal.

Of the Fossile I have set down those employed in our Dispensatory. *Lapis calcarius* may remain, though of no peculiar use. *Osteocolla* should be rejected, as strangers may suppose we have some confidence in the virtues its name implies. *Chalk*, when washed from its flint, is a pure Absorbent, perhaps the best of them, and preferable to the animal Absorbents. *Magnesia alba* should have been added to this set. It has had a considerable reputation as an Absorbent; and, when neutralized, as a Purgative; but I find it is not more absorbent than any of the rest, nor more purgative in less quantity; as Chalk or Crabs eyes, given in the same dose, viz. ʒij. will have the same effect. Therefore it may be neglected.

The Animal Absorbents are all of a common nature except the *C. C. ustum*, which absorbs less than any of the others, and for that reason has been proposed to be rejected; but its salt is manifestly of an astringent kind, and therefore it may very properly be retained, to be employed in such cases where we want an astringent joined with an absorbent power. I do not here speak from experiment.

All

All the others are of common nature and virtues. They differ in some measure in the quantity of acid they absorb, but this so inconsiderably, that cheapness may regulate our choice.

When the presence of acid in the stomach demands the use of absorbents, they may be used with freedom, at least we need not limit the dose for fear of what some have imagined, that they shall be entangled in the viscid matter and form hard crusts; for so much does the stomach tend towards acidity, that they would soon be washed out in a saline state. We may not, however, go too far in abstracting acid, which seems to take place for good purpose in the animal œconomy, *viz.* to obviate the alkalescency so remarkable in the rest of the system. If this be too much corrected, the putrid tendency will, in proportion, take place. Dr. Pringle has mentioned them, from their septic quality, as mischievous in dysentery and putrid fever. His reasoning is tolerably well founded, but I do not apprehend the consequence, for it is not a small quantity, nay, not even a large one, of absorbents, which will hurry on to putrefaction, so much acid is continually generated, and we see every day persons of acid stomachs take large and repeated doses of them without producing that effect. Again, when they are joined to the acid in the stomach, and neutralized, I conceive them acting like other neutrals as antiseptic, and correcting any bad effects they produce by abstraction of acid. In the intestines they are purgative, and partly with some degree of astringent. At all times Absorbents have been noted as diuretic and diaphoretic, which properties, I believe, they exert in the same manner as neutral salts. Carried into the blood, and passing by the excretories, they are in some measure diuretic, and there are more especially astringent. Liquid shell, a combination of the muriatic acid with a calcarious earth, I have employed in nephritic cases with a manifest alleviation of the symptoms. I suspected a solvent power, but found none such out of the body, and therefore thought my success imagination. But now that I find other medicines have the same property without affecting

LECTURES ON THE

the stone, I make no doubt of its action, especially as absorbent earths have had the same property ascribed to them, and those could never reach the kidneys without being joined to an acid in the stomach.

2. A L K A L I N E S.

In talking of these mentioned in our Catalogue, we shall, in some measure, invert the order of insertion.

V O L. A L K A L I,

from its stimulus cannot be given in sufficient quantity to prove absorbent, and its other properties have been already mentioned.

C A L X V I V A

is placed among our Alkalines, as agreeing with them in several properties. Its anti-nephritic and lithontriptic virtues have been already mentioned. Its other properties may be shortly discussed.

Externally it discovers somewhat of an astringent quality, and so is useful in lax and flaccid ulcers. Whether there it has any effect as an Antiseptic I cannot say. In the stomach its chief effects are as an Absorbent and Solvent, correcting the too great viscosity of the mucus. I have said, that Arthritics and Nephritics are liable to disorders of the stomach. Lime-water relieves such disorders. Some would alledge this to be in consequence of a farther operation in the system, but to me its operation seems to be in the stomach, depending on its solvent, absorbent, and astringent power. In the intestines it acts as astringent, and so has been found to stop obstinate Dysentery.

Whether in the blood it is solvent I cannot say. Passing by the several excretories it may exert its effects; for the rest I refer you to Dr. Alston.

As

As accompanied with so much common water, which is so likely to wash out the lymphatic system, and also exerting an astringent property, Lime-water may be useful in scrophulous cases ; accordingly it has been asserted powerful in such circumstances ; but I have never had this property confirmed by experience.

As to any other virtues of quick lime I must remain uncertain.

F I X E D A L K A L I S .

The fossil and vegetable fixed Alkali have, as far as we know, the same effects in medicine ; the fossil is the milder.

Deprived of their air, or in their caustic state, they have the power of destroying animal substances altogether ; and hence are employed as the common escharotic of the Surgeons. The strongest Caustic is always the best, soonest performing what is intended, and I believe with least pain. Prepared by itself, it is always fluid in the air, and it has been found useful to obtain it in a firm consistent form. For this purpose, the preparation of the London College is preferable, and the Quick-lime there added, not only gives a dry form, but preserves the Alkali in its caustic state.

When not so caustic, but more dilute, it is a fine solvent and detergent in various foulnesses of the skin, freckles, morpew, where matter sticks in the sebaceous excretories.

It is extremely effectual in washing off every thing that adheres to the body, and so at first gives a nitid and polish to the skin ; but upon frequent use, by washing out the sebaceous matter, it leaves it dry, shrivelled, and parched.

Dr. Boerhaave employs it as a detergent in ulcers ; but in general, except such as are very foul, and covered with crusts, ulcers do not bear saline medicines at all, as they all produce inflammation. Hence the fixed Alkali has been thrown out of our tincture of myrrh,

and aloes mixed with ointments recommended for dressing issues by some. In the stomach, fixed Alkali may be absorbent, but unless it meets with sufficient quantity of acid, it will act as a stimulant, so that in this intention it is a very uncertain medicine, very apt to be over dosed, not exceeding in this property the absorbent earths, and not, like them, remaining innocent till an acid be produced to wash them away. Even as a stimulant I do not know but we have properly omitted the fixed Alkali, as in that intention more diffusible stimuli are preferably employed. It has, however, been mentioned as an useful stimulus to the intestines. Boerhaave talks of it as a convenient purgative; but in this view, I imagine, with little advantage; for in so far as not neutralized, it proves acrid and inflammatory, and when it is, excels not the neutral salts, which are therefore, with justice, more generally used. Carried into the blood, and collected in the excretories, fixed Alkali proves diuretic; and perhaps there is none more powerful in that operation. It has been employed in various cachectic and especially hydropic cases. Whether it acts by remaining alkaline, is doubtful. It is certainly proper to combine it with a little acid. In its caustic state the fixed Alkali is always most powerful, but then it is too acrid. We should, however, take as near to Causticity as we conveniently can; and I imagine Practitioners are right in using the ashes of plants; because the Alkali of these is in a caustic state. It is commonly joined to an acid wine, by which it is half neutralized, and thus may be exhibited in greater quantity. The wine we commonly use is Rhenish. Fixed Alkali may be a powerful solvent of mucus, but Lime-water is safer, and more effectual.

Huxam accuses fixed Alkali as producing Scurvy, probably only from theory. It may act, however, by absorbing acid, and so hurrying putrescency.

3. N E U T R A L S.

These I have set down, not so much for their being absorbent, as to point out the decomposition they may undergo.

BORAX

B O R A X

has been said to be absorbent. It has been said to be diuretic, but I have never found it to have that property. In the stomach it may be decomposed by the acid, there be absorbent, and act as other neutrals. It may be employed, where that is safe, to take away *Aphthæ*, which it does very well.

T A R T A R U S S O L U B I L I S

is the most agreeable of the neutral salts. The French have used it, and recommended it. It is found that with the fossil Alkali it will be got crystallized, and it is this which is called *Sel de Seignette*, from its inventor, and has been dispersed over France as a valuable remedy. But either in one or the other form it is a purgative, little to be depended upon, because all the tartarous neutrals are liable to be decomposed by the acid in the stomach; and because in soluble Tartar there is only a small portion of Alkali, and the rest Cream of Tartar; and besides, because it cannot be given in sufficient dose. As a purgative it is to be considered in the same light as Magnesia, *viz.* at the same time as checking acidity. Possibly a fitter soluble Tartar might be procured by neutralizing the Tartar with Magnesia.

S O A P,

as an attenuant, has been already mentioned. I have set it down here as decomposed in the stomach, and I imagine its reputation twenty years ago, as of so much use in arthritic cases, depends greatly upon that. Lime-water, too, may have somewhat of the same action.

4. G E N E R A L T I T L E S.

Acidity can only be radically cured by the *Stimulantia*, which restore the afflux to the stomach. The Antispasmodics take off the effect of Acidity. Some of the Stimulants, as the Bitters, obviate fermentation, at the same time that they stimulate and strengthen the stomach, the weakness of which is the most general cause of the disease.

A N T A L-

ANTALKALINA.

There is a doubt whether we can speak of Acrimony as properly alkaline, and perhaps when this exists, it is always with destruction to the system. Du Haen, however, has shewn us, that an Alkali may be developed in the secretories, as in the urine of calculous patients, whose urine effervesced with acids, and turned syrup of violets green. But in general, our fluids are only in an alkalescent state, and it is to this our medicines must be directed. This may occur in any part of the system, wherever there are animal fluids. It may even happen in the stomach, though, on account of its acefcent tendency, but seldom. More copiously it may exist in the intestines, most of all in the common mass of blood, and the several excretories. In all these cases it may be considered as of two kinds, the chronic and acute; the former in Scurvies, the latter in putrid and malignant Fevers. With regard to the first, the nature and causes are sufficiently evident, it arising, *e.g.* in consequence of alkalescent aliment taken in, or obstruction of those excretions by which alkalescent parts are thrown off. With regard to putrid Fevers, there is much darkness and obscurity. In the case of Scurvy, we can suppose the disease to take place without a ferment; whereas in the latter case that must be taken in; and, indeed, a ferment of a powerful nature, and rapid progress. As to its manner of operation, it is doubtful whether it acts wholly on the fluids, or chiefly on the solids. That it does act on the solids often, is evident from the nervous affections accompanying it, and from the cure, we doing much more by Antispasmodics than Antiseptics. I have no doubt of the action of contagion being on the nervous system, though at the same time I will not deny their action on the fluids. I have seen instances of it. A servant, in a family where I was employed, who lived very much upon vegetables, and was without any obstructed secretions, on a sudden was seized with a flaccidity of the gums, violent incoercible hæmorrhage and *petechiæ*, and a putrid Fever, soon ending with death. Here, certainly, the operation was on the fluids; and many instances of the same kind occur in the
annals

annals of Physic; but wherever this action on the fluids occurs, a cure is very little in our power. A chronic alkalescency in the blood-vessels is only to be cured by throwing in a large quantity of vegetable acescents, and by opening the excretions, promoting perspiration and urine. It is not to be cured by any substances not converted into our fluids, however powerful Antiseptics, or effectual neutralizers of Alkali, because it is necessary the vitiated fluids should be entirely supplied with new ones. Practice confirms this; and I mention it to prove what I so frequently inculcate, that art has little power of altering our fluids. As Alkalescency may occur in the *primæ viæ*, it is to be corrected by Acids. These are of two kinds, native and artificial. In treating their virtues, we shall first speak of Acids in general, and then of particular Acids.

A C I D S in G E N E R A L.

Applied to the lips, they shew an astringent quality, as appears by vinegar expelling from them the red blood. This astringency is only proper to be taken notice of when they are considerably diluted. Hence the vegetable Acid is commonly used, and where this part of their operation is required; and hence they are used to bathe over-stretched ligaments. In a more concentrated state, to this astringent they join a stimulant and rubifacient power, and therefore we have thought of applying them in paralytic cases; for which purpose we blend them with oily matters, as hogs lard, in the *Unguentum paralyticum*, to obviate an excess of their inflammatory property. A more fluid oil than the former may be employed, with the advantage, perhaps, of more accurate mixture. This ointment is certainly serviceable, though not with great advantages. If the Acid be blended with too great proportion of oil, the stimulus is not considerable; if not, it is inflammatory, and does not extend over the system. It ought only to be employed where benefit is expected from a few applications of it; for on repeated use, instead of increasing, you will easily see it must impair and destroy the sensation.

sation of the nerves *. Applied alone in a concentrated state, Acids prove corrosive, and destroy the texture of animal substances. This corrosive quality is not only taken off by an union with metals, but encreased by it. Thus, in the lunar caustic, somewhat of its effects are to be attributed to the acid. The same is the case with the Butter of Antimony, to which, as well as to the Acids, as caustics, may be objected the inconveniences of fluidity. How much Acid can perform alone, may be seen in the Medical Essays. It has there been proposed to make an alternate application of acid and caustic Alkali, giving the one, when the other had begun to pain; but in this method, each would hinder the other's operation, and a crust of neutral salt would be formed, which would destroy the effect of the Caustic. In short, the whole affair seems to be a mere whimsey of refinement.

With regard to the internal use of Acids. In the mouth they exert *astringent* effects. To obtain this property, they have been exhibited in various forms. It was Sydenham's practice in the Angina to give the Vitriolic Acid with *Mel rosarum*. Where laxity prevails this may be useful, but it is difficult to distinguish such cases; and in more violent inflammation they are certainly hurtful and dangerous, by their stimulant, and, perhaps also, their astringent power. Acids also exert their *stimulus* in the mouth, and encrease the excretion of saliva and mucus, and hence allay thirst, in which intention they are sometimes given in Dropsies, where we want that effect without encreasing the quantity of fluids. It has been said, that they dissolve the mucus, but this is not properly proved. On experiment, they do not coagulate it like blood, but rather have a tendency that way, *viz.* either concreted into crusts, or in the case of *Aphthæ*. In any sort of Cough,

*. This remedy is equivocal, because as much is lost by the sedative as gained by the stimulant power, and to be avoided; applied externally to the nose, acids have been used in hysterical fits and faintings; as the nitrous and muriatic acids are deleterious, the vegetable only can be used in this intention; the vitriolic has no odour; the vegetable acid from regenerated tartar is most penetrating.

where

where a load of mucus is accumulated in the mouth, they may be used. Alum and Acids have been employed to cure *Aphthæ*, but the practice is doubtful. They will, indeed, take away the *Aphthæ*, but then they are very apt to return worse than before, except in some particular cases, which are difficult to distinguish. Borax answers much better, especially in children.

Carried into the stomach, Acids prove a grateful stimulus to it, and promote appetite, which shows they are not unfamiliar to the system. The acid *reliquiæ* in the stomach are supposed to be the cause of appetite, but this is more connected with the state of the system in general. Acids, by checking putrefaction, serve to preserve at least, if not to excite, appetite; but not only do they obviate the putrefactive, but also check the vinous and acetous fermentations; whence they are used to prevent flatulencies, &c. the consequence of these. At first I thought this difficult to account for, but I now see that it is not acid but acescency which is the disease; that vinegar, which has already undergone the acetous fermentation, is not near so hurtful as vegetable acescents, and mineral acids still less so. Thus lemon, having its astringency improved by roasting, I have seen cure Spasms arising from acescency; and thus the chlorotic girl eats the sour green fruit with safety, while the ripe encrease her disorder; and hence the magistrate in wine countries does not suffer the grapes to be gathered till they are fully ripe, lest the wine should not be well fermented. In the stomach, too, Acids quench thirst, by promoting a flow of liquors to it, by preventing putrefaction, and perhaps, too, as refrigerant. This property which Acids possess, of being cooling and sedative to the whole system, seems contradictory to the stimulus we ascribed to them; but as Acids in certain doses and dilution are astringent, and as Astringents are sedative, the effect is more easily understood. Whether their action be not analogous to that of cold water, I shall not determine. They may be diuretic and diaphoretic, by being carried to the secretory organs; but it is certain also, they exert this property before they arrive there.

In the Intestines. When Acids arrive there unaltered, they may be detergent by promoting the excretion of mucus. As checking putrefaction, as sedative, checking the peristaltic motion, and also as astringent, Acids are useful in Dysentery, but chiefly as altering the bile, to a change of which, Dysentery seems owing. It is the Acescents in this disease which we prefer to the Acids, perhaps from sedative powers analogous to neutrals. The fossile Acids have not the same effect with the others, not proving much purgative. Their action in the intestines ought to be enquired into, as they precipitate the bile.

Whether in their progress through the lacteals they can act as acid, or in the mass of blood, is extremely doubtful, from the dilution they must necessarily undergo before they reach these systems. They might be supposed to cure, at least to check the Scurvy, but neither the one nor the other is observed, so that their effects on the mass of blood are very doubtful. They have been recommended in Hæmorrhagy. Here it is supposed they act on the open vessels, and by coagulating the fluids; but we cannot imagine them to be carried thither, and we must rather suppose they have their effect in the *primæ viæ*, and not materially, but by consent on the vessels.

Though their effect on the blood be denied, yet it has been constantly allowed they may be collected in the excretories. Like other saline matters they may go along with the serosity, pass by the kidneys, and prove diuretic. On this foundation also they might be diaphoretic and sudorific, but from their manner of action these properties seem to be in consequence of their effects in the *primæ viæ*.

Acids are said to irritate the *Bronchiæ*, and promote a Cough, which gives us a caution to their use in Hæmoptoë, and other cases where they are employed. Muriatic acid inflames issues.

P A R-

P A R T I C U L A R A C I D S

We divided into native and artificial. The native Acids in general have the effects we mentioned of Acids, as exerting in the *primæ viæ*, but beyond that they scarcely act as acid; but by the action of the system are liable to be converted in *succum et sanguinem*, and hence are adapted to the cure of the Scurvy, and it is there we frequently employ them. They differ as more or less mild or acerb.

Of the artificial Acids the first mentioned is Wine, the Acid of which approaches to the last, as more or less convertible into the animal fluids. The others are more a-kin, and more invincible to the system, if we except the vegetable, which is divided into the fermented and distilled, which last is less convertible than the former. Such distilled Acid appears in Tar-water, whose action seems only to be in so far as it is acid. It might, indeed, owe much of its virtue to the oil; but practice does not confirm this. Tar-water may be useful in promoting the whole fluid secretions, and in some cases antiseptic; and if you look into what has been writ upon it, you will understand its real virtues from what has been already said.

The fossile Acids are stronger. Muriatic Acid has at all times been famous as promoting appetite, and assisting digestion. I have not given it pure, but joined with some alkali. This Hoffman tells us is the *Tinctura aperitiva Mæbii*, only reddened by the addition of some roses.

Vitriolic Acid is employed for most of the purposes of Acids obviating fermentation, &c. This is supposed superior in hæmorrhagic cases, but I cannot perceive this. It may perhaps retain somewhat of the virtues of concentrated acid; though I will not maintain that.

The nitrous Acidis commonly excluded entirely, out of prejudice, for if equally dilute, it is as safe as any of them. It is not, however, totally disused. Boerhaave employed it in his *Nitrum nitratum*, which is a nitrous ammoniac, only with a superabundant quantity of acid.

Sedative Salt by Homberg was recommended as of extraordinary power, but in no instance has that been discovered fairly. In one or two instances, I thought it had given relief in the Chincough, but I found afterwards its effects must be attributed to other medicines joined with it. Any virtue it has, is that of being gently and weakly sedative, but even this is not well established. The French now acknowledge all this.

Acid of Amber has been frequently used in medicine, though it be not so long since we discovered it to be an Acid. It has failed me in every trial. If any advantage be found from it, it is owing to the oil joined to our *Sal Succini*, for no body has yet used it pure, and indeed it is very difficult to get it so.

GENERAL TITLES.

The *Nutrientia* are the only proper Antalkalines which can be used in the Scurvy. Putrefaction is promoted by any thing weakening the solids, and therefore Astringents are found useful in Scurvy, especially the *Vaginales* referred to, which are both acid and astringent. How far Demulcents can be employed to cover alkaline acrimony, I will not say, but the *Dulcia* are of an acid nature, and may act from that quality.

A C I D S

ACIDS employed in MEDICINE.

{ Ol. Vitrioli.	{ Succī acidi nativi.
{ Spt. Vitri. fortis.	{ Gelatina Ribesiorum, &c.
{ — — tenuis.	{ Miva Cydoniorum.
{ Ros Vitrioli.	{ Syrupus Limonum.
{ El. Vitri. acidum.	{ Rob Limonum.
{ Ol. & Spt. Sulph. per campanam.	{ Acetum Vini.
{ Elix. Vitri. dulce.	{ Nitrum Coralliatum.
{ Spt. Vitriol. Volatilis.	{ Acetum distillatum.
{ Aqua Sulphurata.	{ Spt. Æruginis, vel Veneris.
{ Gas Sulphuris.	{ Cryſtalli Tartari.
{ Clyſſus Antimonii.	{ Acidum Abietis, &c.
{ Spt. Nitri dulcis.	{ Aqua Picea, five Tar-water.
{ Nitrum nitratum Boerh.	{ Spt. Mellis.
{ Spt. Salis communis.	{ — Panis.
{ — — dulcis.	{ Sal Sedativum.
{ Spt. Vitrioli philoſophicus.	{ Sal Succini.
{ Tinctura aperitiva Mœbii.	{ Spt. Formicarum.

ANTISEPTICA.

By theſe, I mean ſuch medicines as obviate the ſeveral tendencies of the ſyſtem towards acrimony. I would have rather choſen the term Antifermentative, as what are included under the title of Antifeptics, obviate the vinous and acetous, as well as putrefactive proceſſes. The Antifeptics, ſtrictly ſo called, deſerve our chief conſideration in medicine. The hiſtory of putrefaction, in every part of it, is abſolutely neceſſary for underſtanding the animal œconomy, and when I inſerted this title, I intended to have ſtudied it myſelf, and to have delivered it to you; but the want of time has prevented the execution of that intention. I muſt be content with referring you to almoſt the only writer on that ſubject. There is, indeed, ſomething in Boerhaave, and in a paper by Cox, in the Philoſophical Tranſactions; but their faults are corrected by Pringle. If this liſt had been made up thirty years ago, it would have ſtood.

stood very different from what it is at present, and many of the substances set down here would have been reckoned as Septics. The list in our Catalogue is chiefly taken from Dr. Pringle, with some additions from analogy, and my own experience.

Dr. Pringle certainly deserves much praise for what he has executed on this subject; but still what he has said requires confirmation and addition, and no experiments are absolutely to be rested upon, till they are repeated with different views, and by different hands. Somewhat of a more correct Chemistry is necessary. Thus we cannot trust his experiments with common Salt, because a pure salt was not employed. This he also, according to the old opinion, supposes to have an absorbent earth for its basis, and the same mistakes occur in other substances. Besides, he does not operate on the best of subjects, and animal blood is what we should wish our experiments to be chiefly performed upon. Hence the whole of this doctrine, as applied to the purposes of medicine, should be received with caution. I would not, however, doubt Dr. Pringle's conclusion.

Two questions I would propose, *viz.* Whether putrefaction is so common a cause of disease, as is imagined? And, Whether antiseptic substances can be introduced in such manner into the human body, as to exert that antiseptic quality in the common mass of blood?

E V A C U A N T S in G E N E R A L.

A doubt arises with regard to the propriety of placing these among the medicines which act upon the fluids. They act, probably, on the solids, but have the fluids for their object. With regard to their operation, there have been several opinions. 1. It has been supposed they act in the mass of blood, as, by rendering the blood of a fluid consistence, they promote the fluid secretions; but this method extends so much in common to all the secretions, as not to explain how particular ones are promoted; for it will still
be

be a doubt how we can give the fluidity proper to particular secretions. 2. To obviate this, it has been said, that all the secreted liquors exist formally in the mass of blood, and that the secretory organ only separates them; and with regard to the Evacuants, it has been supposed that they have an elective attraction to particular portions of our fluids. But all this is a mere supposition. There is no proof of the formal existence of these matters, and of their not being altered in the secretory organ. Neither of these are satisfactory, and hence we must have recourse to this third supposition, that Evacuants, particularly Stimulants, stimulate their respective excretories, as can be proved in the case of Errhines and Sialogogues. It is difficult to apply this to Evacuants in the mass of blood. We must suppose them somehow determined to pass by particular excretories, in consequence of being joined to particular parts of the blood more copiously passing there, and thus stimulating those very sensible and irritable organs. Still a question remains, Whether evacuants may not have a specific power in stimulating one excretory more than another? This is difficult to determine. I must observe, that Evacuants are general Stimulants. Those which affect the nose, carried into the stomach, will prove emetic; into the blood, diuretic, diaphoretic, and pectoral. The Stimulus is not in any that I know of certainly specific, and a common power is evident in most of them. This question will be more fully mentioned under Particulars.

With regard to particular Evacuants, I have inserted them at random. I have begun *a capite ad calcem*, and therefore the first on which our enquiries will be bestowed, is the following head of Errhines.

E R R H I N A.

Errhines are medicines applied to the inner membrane of the nose, producing a discharge of mucus, accompanied with a stimulus, and commonly sternutatory. With regard to their effects in medicine, in the first place it is a general rule, that diseases to be
cured

cured by Evacuants, are more effectually cured by these being applied to the part affected. There are, indeed, cases where the evacuation must be great, and such direct application cannot be made, and in such cases where we intend to alter the distribution of the fluids in the system; but these are the only exceptions. Upon this is the foundation of the virtue of Errhines. They are adapted to diseases of the head, acting partly by the sneezing, that general convulsive motion they produce, and partly by evacuation. Since observations have been accurate, Errhines have not been much used; and where they are useful, is difficult to determine. They are certainly proper in rheumatic affections in the head, in which evacuations of any kind are necessary. I have known instances of not only temporary relief procured from them in such cases, but even the rheumatic diathesis being removed. I have known persons, unaccustomed to Tobacco, on the first beginning to snuff, relieved, and even cured of the tooth-ach, and other rheumatic affections, to which they were subject. In all rheumatic headaches, they are useful; and, analogous to these rheumatic affections, in all neighbouring inflammations of the chronic kind, as inflammations of the eyes frequently are. I see practitioners cautioning against Errhines, as producing congestions in the vessels of the head. If the disease be recent, certainly we ought not to use them; but when it has continued for some time, I have seen a cure from Errhines. Many diseases are of this inflammatory nature, which we do not imagine to be so, as the opacity of the Cornea, which is frequently founded in inflammation, though there be no seeming redness, and also in a beginning cataract. In these, Errhines of the strongest kind may be used. At different times, Errhines have been employed in all diseases of the head, though with what safety or limitation I cannot say.

These are the general virtues of Errhines. The virtues of particular ones cannot well be fixed. I believe our list might have been more general, as there is no suspicion of a specific virtue. Many possibly are omitted, mentioned by both *Materia Medica* writers

writers and Physicians, as the *Lilium convallium*, Benzoin and its flowers, to which *Sal Succini*, an analogous substance, might be added, and the *Vitriolum album*. Those mentioned in our Catalogue are divided into two classes, the Vegetable and Fossile, and I proposed also a division into the *Mitiora* and *Acriora*. I have endeavoured to range them in the order of their power. The juices of the Beet being sweet, are sternutatory, in consequence of the sugar they contain, which itself is an Errhine. Among the *Acriora*, Euphorbium should have been placed lower. Among the Errhines none is more famous than *Turpeth mineral*. In diseases of the eyes it has been much commended in general; but it must be observed, that this and other Acrids are not only apt to produce violent Inflammation and dangerous Hæmorrhage in the membrane of the nose itself, but also in the neighbouring parts. I have seen a few drops of the *Iris nostras*, or *Iris palustris lutea*, occasion a violent sneezing and discharge of mucus with blood, swelling of the whole head and neck, and, perhaps from some neglect of the patient in keeping himself warm, indurations of the cheeks, &c. only yielding to repeated bleedings, but curing, however, the patient of the tooth-ach, and disease for which it was applied. Even where it was given in a slighter dose, often a great rheumatic affection was caught during the use of it. I mention all this, to give a caution that cold got during the use of these remedies is often worse than the disease they were intended to cure.

The only two I have known employed with safety and advantage, are Tobacco and Asarum. The first is only useful when we begin the practice. Asarum is recommended as keeping up a longer flow of mucus than any other. Those who favour it, say it is necessary it should produce a mucus with streaks of blood. Given at the interval of two days between each dose it has cured a violent chronic inflammation of the eyes.

LECTURES ON THE SIALAGOGA.

These are common Stimulants, and often the same as the Errhines. They are divided into two kinds, the Vegetable and Fossil.

The Vegetable are only sialagogue as externally applied, and their effects may be understood from what we have said of Errhines.

The Fossil act in consequence of being introduced into the mass of blood. Of the *Hydrargyrus* we must take a particular notice.

* M E R C U R Y.

Upon this head we shall first consider the operation of Mercury in general; and here the first question that occurs, is, whether it operates on the fluids or solids; as dissolving the former, or as a stimulant to the latter, exciting the respective secretions of those to which it is applied?

* The following account of Mercury is added from the Author's works on Chemistry, and though not so complete as might be wished, may serve to explain the subject more fully.

This is a subject that has been of all the most laboured in Chemistry, and most frequently employed in Medicine.

I shall here endeavour to shew its variety of preparations, and establish their relation in regard to each.

1. The first question that arises is, Whether Mercury is active in its crude state, as is not (in that) acted on by the vegetable acid? This, however, is somewhat doubted; but some speak much of its efficacy, and Dover gave it in a variety of diseases; and when this is the case, a medicine will frequently reap that honour which is only due to nature. It certainly may be converted into an active state, by a small degree of trituration. Nay, even the agitation of the steadiest buildings, when standing in a phial, will induce a black powder on its surface, and, probably, the agitation in the stomach may answer the same intention.

2. It is rendered active by being turned into vapour, and is then indued with a sedative power, and can induce palsies of various kinds; hence Gilders are particularly subject to it. *Vide De Haen*. When used in venereal cases, it brings on a salivation. Why should its effects in these two cases be so different? But this action, in a state of fume, is not peculiar to Mercury, but common to other metals in some degree; but its operation can never be conducted with accuracy.

3. It

The first is the common supposition. That opinion, in the first place, has been supported by arguments *à priori*. 1. It has been said, that it acts from its specific gravity, its great momentum in the mass of blood breaking down its texture. But to me this

3. It is rendered active when calcined, whether by itself, or with gold. It is by this means, probably, only more capable of being acted on by the vegetable acid, and consequently by the acid in the stomach.

4. It is peculiar to Mercury to be rendered active by trituration. It can be thus converted into a black powder, manifestly active to the human body. This trituration goes on slowly in glass vessels when *per se*, but may be expedited by the addition of rough bodies, or even of fluids; and when a small portion is thus converted into a black powder, it gives the whole that appearance; however, upon washing it, it will easily separate from the crude.

Keyser, a celebrated empiric in France, has found a way of converting it into this state more effectually, by triturating it with water, which washes out the powder as it forms, and hence arises its peculiar efficacy. In this state it is soluble in the vegetable acid, for which reason he adds a quantity of that acid, which assists in separating the pure powder.

Other substances have been used to assist the trituration. Honey is much preferable to either the balsams, or gums, of which last I have seen pills made of so stiff a consistence, as to pass through the body undissolved, and unaltered.

This objection is applicable to gum ammoniac likewise, unless at the same time an equal quantity of soap is added, which gives it consistence and solubility.

They have also given it with resin of guaiacum, but this is still worse than the foregoing, as being more difficultly triturated, and less soluble.

In making the trituration we are very apt to be deceived, by thinking it sufficient when no globules appear to the microscope, for after an intermission of the triture, globules will appear that did not before; we should return to it at intervals, and continue it till it is almost soluble in water.

From this difference of triture, very different effects will arise in the same medicine. I have thus seen seven grains produce the same effect with $\text{z} \text{ij}$. of a worse prepared medicine. Oils of any kind likewise, as suet, &c. may be joined, when we use it externally. Some of the Balsams would extinguish it better, as Bals. Terebinth. Liquid Storax, or Bals. of Sulphur, but their erosion of the skin renders them useless.

Here the same cautions are necessary, with regard to triture, and the efficacy of the ointment will be proportionable.

is not at all satisfying; for, first, it is proved by Chemistry, that mechanical force never divides Mixts, but only Aggregates. Our vessels, indeed, whose action may be supposed mechanical, seem to have some such power; but then this is from

It is likewise triturated with testaceous and dry powders, and thus forms the *Merc. alcalizatus*. It is thus rendered capable of being active, but as its action depends on the acid of the stomach, and as the testaceous powders would destroy that acidity, its power of acting would be thus destroyed.

Sugar answers better, especially if we add a drop or two of essential oil to assist its division.

Triturated with sulphur it becomes an inert substance, as being capable of resisting the vegetable acid.

This I could determine *à priori*, whether it was in the form of *Æthiops Mineral*, or native, or factitious Cinnabar. Some say these are active, but I never could find them to have any effect. I have seen the *Æthiops Mineral* given in as large quantities as the stomach could bear, when the Sulphur only exerted its laxative effects.

Mercury may be united with sulphur in three ways; first, by trituration; secondly, by fusion; thirdly, by sublimation; of which the last is the worst, because the closer the connection the less active.

5. We are now come to its saline state. There are some of its combinations with saline substances that are not soluble in water. This, perhaps, may be thought an objection to the term, but we shall wave this, and call every combination with acids saline. Here the alkalies are entirely out of the question, as it entirely rejects any union with them, and as the least of their presence entirely destroys the gilding process; the same, too, with regard to neutrals.

Its union with the Fossil Acids has always been known, and to these I have added the Vegetable. I shall speak of it as combined with these in its crude, calcined, or triturated state.

The calcination and trituration of Mercury is a curious problem, and what other metals are not subject to.

In trituration, Are the particles that constituted its crude nature separated? Or does it admit of any addition under it? I should be rather of the latter opinion; but what this addition is, whether of some matter universally diffused, I know not. We may next consider it, as it is diversified by the acids.

Turpeth Mineral may be made in two ways; first, by adding the Mercury to the Vitriolic Acid, when at the boiling heat, and thus obtaining a matter that has the appearance of a white calx, which, on being washed in pure water, is converted into a yellow powder.

This,

encreasing the cohesion, but not altering the mixture. 2. Supposing such effect could take place from mere mechanical force, that here is not sufficient; for any body reduced to so great tenuity as to swim in a fluid, will have, in proportion to its greater tenuity, the ratio of its

This change of colour is a curious problem. Secondly, it may be made by dissolving the Mercury in the Nitrous Acid, and then adding the Vitriolic, and then by washing it we get the Turpeth.

This is the most easy process, but it is the most acrid preparation, because there is a quantity of the Acid adhering, but by repeated affusions, with the assistance of heat, it may be made nearly the same.

Mercury is next combined with the Nitrous Acid. These preparations have been but little employed in medicine, and have rather been used as the foundations of others.

It is likewise combined with the Muriatic Acid, and this either by precipitation or calcination, and accordingly forms either the *Mercurius sublimatus corrosivus*, or the *Mercurius precipitatus albus* of Boerhaave.

The Marine Acid does not unite with it in a fluid form, and must therefore be used either as combined with metals, or with neutral salts; for this purpose common salt is added to Mercury dissolved in the Nitrous Acid.

A certain rule to judge of its acrimony, is from its solubility in water, for the greater quantity the water will take up, the more salt adheres to it, and consequently the more acrid is the preparation.

The method of precipitation from the menstruum, when it is in the form of a *Calx Mercurii*, is much easier; but there is an objection, that the Acid is in too great quantity, and the preparation is not easily brought into a crystalline form. We have found a way, however, of managing this, by suspending it in *Nitrous Ammoniac*, and then adding common salt. All the other preparations of Mercury depend on their being rendered more mild, or more acrid.

They are rendered milder, first, by the abstraction of the Acid; or, secondly, by the addition of Mercury.

I. By the abstraction of the Acid. Some have doubted if Mercury is rendered more powerful, by being added to Acids; but I think none who are conversant in practice can deny it. The degree of trituration certainly varies its efficacy, but one-eighth of a grain of corrosive Mercury is a dose.

One method of abstracting the Acid is by calcination, as in the Red Precipitate. The foreign Precipitates are thought to be better than those made at home. The London College has, therefore, given particular directions, nay, more than necessary, as I think; for the whole difference between the foreign and domestic seems to depend on the degree of calcination, which is sometimes carried too far, so as to sublime too much of the Acid.

Another

superficies to the quantity of matter so increased, as not to be able to overcome the resistance. Thus the most ponderous gold can be so minutely divided as not to be able to overcome the cohesion of water or spirit of wine, but to be suspended in them ; so that much less can

Another method is by attraction of the Acid. This is of two kinds, first, when the acid is attracted only ; and, secondly, where the Mercury is precipitated. An instance of the first is the *Pulvis Principis*. *Vide Lewis*. The water here dissolves that part which has the largest proportion of acid, and leaves the less soluble, and consequently less acrid behind. Water applied to any of the saline Calces will thus abstract the more active part.

Ardent Spirit, in many instances, abstracts the Acid from metallic substances pretty entirely. I think I have seen Corrosive Sublimate rendered inactive by this means. It may likewise, when dilute, act like the water, in abstracting the most acrid part. This is the foundation of the *Mercurius Corallinus* and *Panacea Mercurii*.

Camphor unites with Acids in the largest quantity of any other substance. It triturates easily with, and has been added to the Turpeth Mineral, (*Vide Edin. Med. Essays*;) and I have often used it with success before our late improvements.

Mercury is rendered milder by attraction and precipitation. The *Mercur. precip. Fuscus Wertzii* is Mercury dissolved in the Nitrous Acid, and precipitated by a fixed alkaline Salt ; this gave a mild preparation, but its unseemly colour was the chief objection. To obviate this the Muriatic Acid was used, which gives us the *Merc. precipitatus dulcis* of the former Edinburgh Dispensatory ; but it has been but little used in our shops, though it might be an useful medicine, and answer pretty nigh the same intentions with Calomel.

The Muriatic Acid has been used in conjunction with Copper, so that the Mercury was precipitated in a green powder. Different accounts have been given of this, some approving, others disapproving of it ; but it seems to act uncertainly, and with violence. I should think that from this combination of copper we might receive advantages in external applications.

The *Mercur. precipit. albus* of the London Dispensatory is made both with fixed and volatile Alkali ; the colour depends on the proportion of the volatile Alkali.

Another way by which mercurial preparations are rendered milder, is by a fresh quantity of Mercury. This is effected in the process for Calomel, where a fresh quantity of Mercury is added to a portion of Corrosive Sublimate. The union of these is first made by trituration, and it then is more intimately effected by repeated sublimations.

Sublimation to the second or third time may produce the intention, but to carry it farther will only separate the Mercury.

The

Mercury be supposed to alter the cohesion of our blood. 3. Supposing the force of Mercury capable to break down our blood, the quantity, even the greatest we can suppose to be introduced, will not have the effect, so that every thing said on the mechanical action of Mercury on the Fluids is without foundation.

The only true standard of a sufficient sublimation is to examine its specific gravity in ardent spirits, and so determine their comparative mildness. Two sublimateations, after a sufficient previous triture, generally are sufficient.

The metal may have the acid adhering to it in any proportion, but the acid seems to have a point of saturation with regard to the metal, and when this proportion is suited, neither water nor alcohol will have any effect on it. But thus endeavouring to render the corrosive mild, we bring it to a *Mercurius dulcis*, and this equally well, either by abstracting the Acid, or by adding Mercury.

MERCURIAL PREPARATIONS rendered acrid, or kept so.

These are rendered more acrid by redissolving the Precipitates. When Mercury is precipitated from any of the fossil acids by alkalis, it is soluble in the vegetable acid. I have precipitated Mercury from the nitrous acid, by means of fixed alkalies, and again dissolved it in the muriatic, and from thence obtained it in crystals. This is a pretty accurate preparation; one grain of this I dissolved in an ounce of water, and gave twenty drops of it for a dose, so that supposing this grain contained one third of Mercury, which seems to be the case, this one third dissolved in an ounce of water, or four hundred and eighty drops, these twenty drops could only contain $\frac{20}{480}$ of one-third of a grain of Mercury. This shews the great addition of power that Mercury acquires by being joined to Acids. This is the *Mercurius solutus*, as I have called it.

By Suspension with SAL AMMONIAC.

I used formerly to say, that the combination with the muriatic Acid was more corrosive than that with the nitrous or vitriolic, but I have found the nitrous equal to either of the others; but when dissolved in water or alcohol, a portion of the acid is abstracted, so that the Mercury falls to the bottom in form of a powder; hence arose the difference of its efficacy, and the dangerous inaccuracy attending it; for whether dissolved in water or brandy, the strength of the solution will be widely different at different times, and every day fresh Mercury will be subsiding. For these reasons it was that I first thought of the preparation just mentioned. Sal Ammoniac renders the metallic Salt more capable of being taken in greater proportions, as it increases the suspensibility of water to twenty times its natural power. The Sal Ammoniac not only enables us to give it in a smaller dose, but by continually suspending the Mercury it renders that dose always accurate. All these preparations differ only in being mild or acrid.

Of

Secondly. Those who alledge that Mercury acts on the Fluids, alledge it acts by a septic power. The proofs brought are, the remarkable fætor of the saliva, the tumid flaccid gums, and the blood ready to flow out from them. These arguments seem very specious. Again, say they, experience shews that Mercury is hurtful in the Scurvy. With respect to its effects in the Scurvy, that may depend on its irritation and stimulus, and all other stimulants have the same effect in aggravating Scurvy. As to the fætor of

Of the Action of MERCURY.

I imagine that Mercury acts only as a stimulus on the sensible and irritable parts of the solids. It has been long thought to have acted on the fluids by dissolving them; but supposing it should do so, there are undoubted proofs, too, of its acting on the solids. Thus it acts as an emetic and purgative, as a stimulant to the whole vascular system, as a diaphoretic and diuretic. Had it acted on the fluids only, every secretion would have been increased equal with the salivary. It never produces any effects on the secretions, till it has arrived in form and substance at the secretories. Thus we see it produces a slight inflammation, and increased discharge at the salivary glands.

In the height of a salivation, where the inflammation runs so high as to render bleeding necessary, an inflammatory crust was found upon the blood, a circumstance very inconsistent with the supposed dissolution.

We shall, however, advance, on the other hand, the most favourable fact, in support of its acting on the fluids. It is found greatly to aggravate the scurvy, where the blood is found to be alkalescent, and disposed to fluidity; and that the first symptoms of a scurvy are similar to those of an incipient salivation, *i. e.* a putrid laxity of the gums, tendency to bleed on the slightest injuries, and a fetid breath. So far I allow. But I imagine it has only these effects when accumulated in large quantities in the salivary glands, and that it does not produce the same effects in other parts of the body. By this particular accumulation in the salivary glands, it stimulates them, and causes a greater flow through their organs, but does not, by inducing a dissolution, occasion the blood to discharge itself by this outlet. The acrid preparations stimulate the stomach, and, in consequence of that, perhaps the whole system by consent.

The mild preparations never answer but when they run off by the saliva. This accounts for the supposition, that salivation was the only true application of it. If Mercury had acted on the venereal poison as an antidote, it might have been expected to have performed the cure without any sensible evacuations. Salivation was thought to be the only way of effecting it, but we now know that it may be done by other ways, and with less trouble. We have instances of its being cured by the intestinal discharge; but this is tedious and doubtful. The cure by urine or sweat must chiefly be promoted by the more acrid preparations. But in some people all mercurial prepa-
rations

the saliva, possibly it may have the power of producing that, but not of extending putrefaction over the system. But the fœtor can be produced without Mercury, and there is no instance of an increased secretion being kept up for any length of time, without the same symptoms occurring. This accounts for the other effects in the mouth, which arise evidently from the putrid saliva; for no one instance is alledged of a scorbutic putrefactive taint taking place in any other part of the system. There is no alteration in the blood during a salivation, and its viscosity appears then as strong as at any other time. Salivation is attended with an inflammation, and the blood shews an inflammatory crust, which, indeed, may be said to be a symptom of the Scurvy; but then, if we examine it, we find it denser than it appears in that disease. Again, after the operation of Mercury is over, no taint appears in the blood, but, on the contrary, the person is in better health than before, and gives marks of a firmer state of it.

From what has been said, I would conclude, though not certainly, that Mercury acts neither by its mechanic nor septic powers. We have proved at least that it is not septic in the mass of blood; but if it be so, only as collected in the secretories. But though we should allow Mercury in a considerable quantity to have somewhat of a septic power, yet in the ordinary dose in which we exhibit it, it can never have that effect. In the case of unction, that indeed may be

rations have a particular tendency to the mouth; here we must yield to the natural tendency, and suffer the salivation to go on; but when it can be done otherwise, it is with less trouble to the patient, and less care and attention to the practitioner.

N. B. There is one preparation of Mercury which I forgot to insert, viz. a third way of uniting it with the muriatic acid. Sal Ammoniac is triturated with Mercury till the globules disappear; this is put into a moist place, where it suffers a deliquescence, some of the Mercury re-assumes its fluid form, the deliquescent part is to be poured off, and the rest triturated with the liquefied Mercury till the whole is dissolved. This operation is founded on the stronger attraction Mercury has to the muriatic Acid than the volatile Alkali has.

M m m

denied;

denied; but we have many instances of one-twentieth part of a grain of some preparations of it taken internally having the same effect as some ounces by unction.

All this will be farther confirmed by the arguments we can bring for the action of Mercury being as a stimulant. All its effects may be explained from this supposition. From its stimulus in the stomach it proves emetic; and carried into the intestines, it is purgative from the same quality; into the blood, diuretic and diaphoretic; and, in short, like other evacuants, a very general stimulus. Other arguments for its action as a stimulant are, that it never acts but in an acrid condition, discoverable by its metallic cupreous state in the mouth; that a salivation can be excited by its external application to the salivary glands; that its effects are always accompanied with some degree of fever and inflammation; that its effects in ulcers are plainly derived from its stimulant powers producing that degree of inflammation necessary to the being of good pus, and that it produces these effects much better by external application than internal exhibition. In proportion as these proofs of the stimulant power of Mercury are convincing, they weaken all others that may be alledged for any other method of action.

This reasoning is somewhat connected with another question, *viz.* Why Mercury is more particularly and naturally determined to go by the salivary glands? The fact is certainly true, and more so of this than of any other acrid acting by a common stimulus. Those who talk of its mechanical power say, that the more ponderous parts of the blood keeping the axis of the canal, and the course of the blood, from the left ventricle to the head, being more in a strait line than in the descending aorta, that therefore the more ponderous and solid parts will be determined thither. I would alledge that this hypothesis is not supported by Anatomy; for the aorta suffers a curvature before it gives off the carotids, so that the heavier molecules must be reflected into this curvature, and consequently the
reasoning

reasoning must be groundless which is built on the contrary supposition. Another supposition is, that Mercury breaks down the blood to the size which fits it for passing off by the salivary glands; but this is very difficult to suppose, and entirely hypothetical: Much rather may we say, that Mercury goes chiefly to the glands, from a certain attraction to the liquor of the salivary glands, in the same manner as neutrals, by an alliance to the watery parts of the blood, are concentrated in the kidneys. The nature of the saliva and of many other of the secreted fluids is not known. I would alledge Fordyce's experiments, that it comes nearer to the mucus than has been imagined. This uncertainty with regard to the saliva, prevents my endeavouring to go farther to give the reason why Mercury is particularly related to that liquor. Upon the whole, Mercury appears a very universal Stimulant, and general Evacuant, being emetic, cathartic, diaphoretic, diuretic, and salivatory, and accordingly we find it one of the most universal aperients and deobstruents with which we are yet acquainted.

Thus much we have thought proper to say with regard to the general operation of Mercury. We shall now proceed to talk of the preparations of Mercury, as in these the effects are diversified.

PREPARATIONS of MERCURY.

With regard to the use of the preparations in practice, Crude Mercury, and the combination in *Cinnabar* and *Æthiops mineralis*, to which may be added the *Æthiops antimonialis*, in so far as it contains Mercury, can only by accident, or indirectly, prove medicines. All the others are not only active but powerful; the only distinction, however, seeming to be, that of being more or less acrid. How to determine their difference in that respect is not easy. It is commonly supposed that Mercury, triturated with Turpentine and Honey, is one of the mildest preparations, and that every addition, as well that by acid, as the fire, gives additional acrimony. The preparations by triture are very apt to be imperfect, and I maintain they are more

M m m 2

active

active as longer triture is bestowed. Hence I should imagine, that if Mercury in this way were properly divided, the preparation might prove equally acrid with the precipitate *per se*. As prepared in the shops, the strength of this medicine is very imperfect, and uncertain. Generally no other test is sought of the preparation's accuracy, but the blackness and disappearance of the particles. Although they disappear at present, upon standing they very frequently are collected, and re-assume their form, and therefore, after having obtained the foregoing tests, we should let the ointment stand for a day, and use the assistance of a glass, to see if any collected globules can be discovered.

Mercury united with the Vegetable Acid, as in Keyser's *Drassia*, should be one of the mildest preparations. The preparations of Mercury with the nitrous Acid are milder than those with the vitriolic, and these again less acrid than the muriatic preparations.

All these differ in their operation as that is extensive or partial. Taken into the stomach, they show their effects by producing sickness and pain, and sometimes go the length of vomiting. This leaves some doubt of the specific stimulus of Mercury, which, in opposition to Antimony, will often sooner inflame the stomach than prove emetic. Whenever Mercury is to be used in that intention, it must be given in a large dose. I do not know whether it is by accident, or design, that Turbith Mineral has been here commonly employed. Given in the dose of half a grain, it acts on the system in general; but in a larger dose, *viz.* gr. viij. it is said to prove emetic. In less quantity it excites insufferable pain, and must be given so as to operate directly. This Turbith Mineral is found to have effects different from any other of the preparations. These will be known from what we shall afterwards say on Emetics in general. It is found to resolve swelled testicles, when Mercury in other forms has failed: It also salivates longer than many other of its preparations; but this is not peculiar to it.

In the intestines, the stimulus of the mercurial preparations is exerted with greater effect, but still it is confined to the part, and Mercury acting in this manner is carried off without any farther effects on the system. Mercurial purgatives are seldom employed alone, but in conjunction with other purgative medicines, although I have known small doses of Calomel employed with advantage. When we purge, we commonly think we are operating on the common sewer of the system; but little advantage is to be found from Mercury employed in this way, as its virtues depend chiefly on its operation on the body in general. As a purgative, the most insoluble preparation of Mercury is the best, and therefore Calomel is used; but when used in this way we are disappointed if we expect it should exert the other virtues of Mercury.

The great effects of Mercury seem to be exerted when it is carried into the mass of blood, and is united in the excretories. A diffusible preparation of it is necessary for this purpose, and advantages arise from the different determinations. Mercury seems to change the whole mass of blood: This it does in three ways, by Purging, Sweating, and Salivation.

Purging is one of the slowest means. There may be another way than the common of making Mercury exert this action, *viz.* by introducing it into the blood, and then determining it to the intestines. Purging is never excited by any means without spasms of the intestines, which, when the operation is continued, are apt to end in durable spasm and inflammation. These are attended with very dangerous consequences; and neither does the method of purging by unction answer much better, (altho' perhaps more effectual,) because it is attended with very great pain. The method of Douglas is, on this account, now neglected. He followed, in this method, Dessaut. Sweating is the easiest operation of Mercury that I know, but the difficulty here lies in preventing any of the others from taking place.

As

As this of Sweating is so diffuse an operation, Physicians have been led to employ Salivation, which, however, is attended with many inconveniencies, as inflammation often to a dangerous degree; and it is the universal consent of Practitioners, that they employ only Salivation because no other means can be used. If then means be found of exciting copiously, and keeping up a Sweat, it should be universally practised. We have now learned that the most acrid preparations of Mercury are most apt to have this effect, because they will more readily produce that encrease of circulation, on which the encrease of this excretion depends. Here the Acrid must be given in smaller quantity than will make it run to the salivary glands. In a great dose, indeed, these preparations are apt to inflame the stomach, and if they go to the salivary glands are more troublesome than others; but where this can be prevented their operation is much more easy.

In order to avoid the inconveniencies arising from Salivation, raised by the acrid preparations, the milder ones should be chosen, and slowly introduced, and that by way of unction. One of the inconveniencies of a Salivation is, that when Mercury is going off by the salivary glands, there are certain means which drive it to the intestines. This must be guarded against; but in a medicine introduced by the mouth there is more danger of this happening, especially as we intend it should be mild, and consequently less soluble; whereas by unction it can be given slowly without that effect; and for the method of exhibition, Astruc's directions are the best. All these various preparations vary according to regimen.

I should now proceed to the particular diseases in which Mercury is useful; but as its action is never specific, and only as an evacuant in general, I shall decline this at present. It is certainly one of the most universal Deobstruents and Aperients yet known. Some others may be adapted to particular cases, but none is of such extensive application.

E X P E C-

E X P E C T O R A N T I A.

Expectorants have been much talked of, but little understood. The discharge by the lungs seems to have somewhat in common with urine and perspiration, but of this I shall not speak positively. By *Expectorantia* here, we have only in view such medicines as promote the secretion of mucus in the lungs. To talk of these is difficult. I have set down a long list; but, after attending a thousand times to their operation, I am not able to say whether the effect produced depended upon the medicine, or nature. This shews the uncertainty, not only of medicines acting on the fluids, but of such as are thence deposited on the excretories, they being liable to so many changes in the *primæ viæ*, &c. before they get thither. Expectorants have been supposed attenuant. The difficulties regarding such a power have been formerly mentioned. This supposition has been of bad consequence in practice; having led us to employ a great number of acrid medicines in this intention. On this head Dr. Boerhaave has been extremely useful. In his Chemistry he very properly cautions us against the use of medicines of an acrid kind, in diseases of the breast. In so far as our Expectorants are attenuant, they act only as stimulating the excretories. Possibly another action of them may occur, *viz.* that of antispasmodic. Some medicines are diaphoretic from this quality, and hence I imagine *Assa fætida* acts as expectorant rather from its antispasmodic virtue, by which it removes the obstruction of mucus.

The four first plants in the Catalogue were mentioned among the *Verticillatæ*. They all contain an essential oil, acrid and inflammatory. Their virtues, as Expectorants, are not well established by experience, and I imagine that, from their inflammatory nature, their use should be considered as dangerous. Of three of them, *viz.* the *Hedera terrestris*, *Hyssopus*, and *Pulegium*, I never saw the expectorant effect. The virtue of *Marrubium* is perhaps greater, but then it is more acrid than any of the three mentioned, and I have

have never seen it tried. Analogy, and its sensible qualities, are against it.

ENULA CAMPANA.

This is much spoken of. I can say nothing concerning it from my own experience. It contains an acrid essential oil, and so is equally suspicious with the last. It is, however, to be observed, that in distillation it gives out an oil resembling Camphire, and a volatile salt, which should lead to observe its medical properties. Elecampane is said also to be laxative, and to act on the kidneys. I should have observed, that Diuretics often prove pectoral. Perhaps we might invert the observation, and say, that, as pectoral, medicines may be diuretic. On this foundation, probably, a diaphoretic power has been attributed to the Elecampane. It has likewise been recommended as emmenagogue, but this virtue is liable to the same doubts as that of other medicines operating through the mass of blood. Upon the whole, from this general method of talking, no application can be made to particular diseases.

The next three, *Iris Florentina*, *Nicotiana*, and *Scilla*, are all emetic and purgative, only pectoral in consequence of a common and universal stimulus, and in so far as by any means their other qualities are taken off.

IRIS FLORENTINA,

in its recent state, is very acrid, but loses that acrimony by drying, when, if it has any virtue at all, it is that of expectorant.

NICOTIANA,

under any preparation, is more powerful than the former, and may deserve the praises of *Materia Medica* writers; but its acrimony, and sensible qualities, prevent its frequent exhibition.

SCIL-

SCILLARIA

is an universal stimulant and remarkably acrid substance. It acts as an Emetic, and in that intention is frequently employed, whether with any particular advantage I cannot determine. It is also purgative, with a hydragogue effect. Among Haller's Dissertations, there are two upon Squills, where its considerable effect in hydroptic cases is observed, and that large doses of it have proved a cure; but in such case it is merely on the footing of the common hydropic purgatives. Carried into the blood, the Squill is diuretic; but in that view it oftener disappoints than answers our intention. Its pectoral effects, though much cried up, as well as its diuretic, are very liable to deceive us; and it is very difficult to introduce the medicine so far. The only chance we have of succeeding, is this, *viz.* the dissipation of the more volatile parts, by which means we prevent the immediate action in the stomach, and have a better chance of introducing our medicine, in greater quantity, into the mass of blood. Hence almost always they should be used dry. This drying, however, should have bounds, which cannot be well fixed by a Physician. If Squills be dried in tunics, it does not answer, and therefore it is very proper to cut it transversely; for otherwise the drying is prevented, by the membrane covering the tunics. When we want to extract the Squill by vinegar, in order to mitigate its taste, or whenever we are to infuse it in wine, or water, it should always be in a dry state; and this is a general rule with regard to all plants; for their common juices hinder the application of any menstruum. Hence the London *Acetum scilliticum* is preferable to the Edinburgh. *Oxymel scilliticum*, with all the other *Mellita*, should be rejected from the Dispensatory. We have industriously chosen fresh Squills in the *Pilulæ scilliticæ*. These Squills suffer a change by drying, so that their dose is very uncertain, and they become insoluble; wherefore, in this preparation also, the dry Squills should be employed.

T U S S I L A G O.

The *Petasites* belongs to this genus, and probably possesses the same virtues with the *Tussilago*. *Petasites* is more acrid; whether or not it is a better medicine, I cannot say. Both have been famous for pectoral virtues. I should have rejected the *Tussilago*, though supported by this reputation, had it not been for its use in the *Scrophula*. Dr. Fuller recommends it in his *Medicina gymnastica*, and mentions cure from it; and on frequent exhibition, I have found it of advantage. How it acts I do not know, as I do not know exactly the nature of the disease. From experience, I have great reason to believe Dr. Fuller in the right, and that *Tussilago* will succeed where salt water has failed. I used it in different shapes. I employed the recent juice in the quantity of ℥ij. or ℥iij. a day, and when the juice could not be procured, I used, like Fuller, the dry herb in decoction, and I believe with greater advantage. I find the disease oftenest in the spring, at which time the fresh herb is not in so perfect a state as it may attain, and therefore I believe the decoction will be found the most convenient, as well as effectual method of exhibition. Many remedies are recommended in the *Scrophula*, and experiments ought to be made with them, in order to discover the nature of the disease. *Cynoglossum* has been recommended in the same disease. I can say nothing concerning it, but that it is intitled to a trial.

BENZOIN, and STYRAX CALAMITA,

are remarkable for a volatile acid salt, which each of them gives out in distillation. How far this may be the foundation of their pectoral virtue, I cannot decide; for with respect to the *Flores Benzoini*, that virtue is as doubtful as in other pectorals. From any dose in which it has been exhibited, no effects have been seen, and I have given it in the dose of ℥j. and 5℥s.

I take occasion hence to alledge, that Benzoin, in officinal preparations, is of no other use, but as it gives an agreeable flavour.

P I X L I Q U I D A

is properly an empyreumatic oil of vegetables.

S O A P.

Twenty years ago the reputation of Soap was very great. Many instances have been alledged of its effect in pectoral cases, and I think I have observed some advantage from it. It has a better chance of success than many others, because it may be given in considerable quantity, which is very suddenly passed off by the kidneys, nay, even by the mucous glands; but this quality of it is probably only to be obtained by those who can take it in considerable doses.

G E N E R A L T I T L E S.

1. S T I M U L A N T I A.

Under this head, I have referred to the *Umbellatæ*, as Anise, &c. There is a foundation for their pectoral virtue, in so far as they are generally diuretic. On the same footing the *Siliquosæ* are referred to, of whose virtue there is undoubted evidence. We have formerly mentioned the use of these in hoarseness. Their stimulus, though acrid, is not inflammatory, but from their great volatility, and its transient effect, very difficult to be conveyed to the breast, so that we are very often disappointed of their effect. The best method of obtaining it is to introduce them entire, when, in consequence of slower solution, they may be carried into the mass of blood. As to the *Alliariæ*, referred to at *d*, the same method of exhibition is requisite, in order to obtain their pectoral virtue, as in the *Siliquosæ*; and we shall never see Garlic diuretic, except when given entire. It is said to be so penetrating as even to prove pectoral applied to the soles of the feet. But this penetration through our porous substance is not to be depended on.

2. A N T I S P A S M O D I C A.

Of these, as pectoral, I think I have as often experienced the good effects of *Assa foetida* as any. Ammoniac is supposed peculiarly adapted;

adapted; but to me it is not so antispasmodic as the former, and more heating and inflammatory.

3. DEMULCENTIA.

At *c*, to which I have referred, several Sweets are mentioned. I was doubtful whether I should consider these as pectorals, as being demulcent, or in consequence of their saline stimulating nature. I incline to the last supposition, for Sugar stimulates the nose and excites sneezing. Perhaps in hoarseness and catarrh their effects are really the same as they are alledged to be.

E M E T I C A.

What Vomiting is, it is not necessary for me to define; and in what state of the stomach it consists, I leave to Pathologists. With regard to this head, it would seem unnecessary to mention the various effects of Vomiting; but as I find the effects of particular Emetics are not to be understood without a knowledge of the effects of Vomiting in general, and as I have little to say on particular Emetics, I shall enter a little upon that enquiry. First, then, as to the various effects of Vomiting, or a state of the stomach analogous to it.

1. Vomiting evacuates the contents of the stomach itself. It is not easy to know when that is fully performed. It is easy to see, that various matters may be detained in the *plicæ*, or *mucus*, so that frequent ablution must be required. Many have got now into a method of promoting few repetitions in Vomiting, and giving small ablutions; but I think I can maintain, that by this method we disappoint ourselves of the effects to be obtained from a full evacuation. Small quantities of a medicine may excite vomiting, but that they will produce a full evacuation is very doubtful.

2. Vomiting causes a flow of liquors to the stomach, purges it, (if I may so say,) and emulges its mucous glands; which operation seems

seems not occasioned by the stimulus, but produced in the same manner as in Senac's experiments.

3. Vomiting not only emulges the mucous follicles of the stomach, and promotes a flow of gastric liquor, but has the same effect in the neighbouring glands, especially the pancreas and liver.

4. While Vomiting continues, it not only inverts the peristaltic motion of the stomach itself, but also of the intestines, which pour out their mucus to be carried to the stomach, and evacuated with its contents. This serves to explain the throwing up of bile, but is by no means the common cause of it, for it is manifestly produced by squeezing of the liver and gall bladder, a proof of which is, that it occurs at the end of the operation; which throwing up of bile is, not without reason, thought a test of a Vomit's perfect operation, and was the rule to stop, of a Physician who employed Vomiting as a *panacea*. As squeezing the liver and gall bladder, Vomiting may push biliary stones into the intestines, and cure the jaundice; of which, however, I have frequently seen it a cause, because Vomiting, by the same method of operation, might force the stone into the duct. As inverting the peristaltic motion, Vomits are useful in diarrhoea and dysentery; but, independent of that, they are probably more useful as purging the intestines, occasioning a greater flow of liquors into the intestinal canal, which, if the Vomiting continues, are ejected by the stomach; a proof of which is, that the faeces are often thrown up; which again, by the bye, shows that the intestines may be inverted in the whole track. If the Vomiting ceases, the increased secretion is carried off by stool, so that, at any rate, the adherent foulness is washed away. This also explains another point, viz. that, independent of being carried thither, Emetics may be purgative, by squeezing the track of intestines.

5. Vomiting squeezes, and occasions a constriction of the whole abdominal viscera, especially the mesenteric glands, and in consequence

quence pumps the whole lymphatic system. On this account Vomiting has the power of encreasing absorption, as also from its evacuating property. Purges are, indeed, more frequently employed in that intention, but Emetics answer equally well. There are several instances of the waters of hydropic persons evacuated by Vomiting, and I have had occasion to observe such a case.

6 As Vomiting occasions a constriction, squeezes and emulges the whole abdomen, so I imagine it has the power of affecting the kidneys. Emetics, indeed, commonly do so, but this may be said to be owing to the quantity of water drank along with them; but I think a great deal depends on the consent between the two organs; for as irritation of the kidney will produce Vomiting, so, on the other hand, it is reasonable to think that Vomiting may also act upon the kidney. Hence, Vomiting would seem useful in propelling stones in the kidneys. This, indeed, is difficult to determine, and some have imagined they are always dangerous in nephritic cases. As to myself, I confess I am afraid of them, but others use them with success and safety; and thus much may be said for the practice, that it seems to be an imitation of Nature, which often excites a Vomiting in the cases mentioned, and probably for good purposes. So much for the effect of Vomiting in the abdomen.

7. These effects are, perhaps, extended to the viscera of the thorax. I have observed to you, that the promoting of expectoration was very doubtful: I have seen it much oftner effected by Vomiting than by any other means. We may here observe, that the action of Vomiting is attended with obstruction of inspiration, as vomiting can only take place when the diaphragm is relaxed in expiration. The application of this will appear afterwards.

8. Vomiting increases the constriction of the fauces, and forcibly emulges the whole of the mucus and salivary glands. I have seen it

it have the effect of masticatories, relieving rheumatic affections of the head, tooth-ach, &c.

By preventing inspiration, Vomiting prevents the regurgitation of the blood at the end of expiration. The accumulating of blood produced by Vomiting is only momentary, and may be soon counterpoised, as we shall see by considering its advantageous effects on the system in general.

1. During the time of Vomiting the pulse is small, weak, and intermitting.

2. If when Vomiting is over, the stimulus continues, the circulation is encreased, with a fulness and softness of the pulse, a determination to the surface of the body, and sweat; this last may be supposed to proceed from the encreased circulation; but it may also from the consent of the stomach and surface; and I think it is probable, that here, as in other cases, an antispasmodic virtue takes place with regard to the extreme vessels, which is illustrated from this, that Emetics, combined with other Antispasmodics, as Opium, encrease the virtue; so that combined they become more powerful Diaphoretics than each when alone.

These are the primary effects of Emetics. With regard to the secondary, it is impossible to enumerate them all here. They will easily be deduced from their emptying the stomach, and encreasing secretion and circulation, which may be a part of their antispasmodic virtue, especially in the extremity of the vessels, as in the case of Fevers. On the consideration of these we must not enter at present. I shall only say, that as the animal œconomy has numberless means of preventing disease, the Vomiting excited in the beginning of Fevers seems to be for good intention; and though it does not always cure, it may justly give indications.

After

After thus mentioning the operation of Emetics, with regard to their salutary effects, we shall next mention the cases where they are forbid.

1. They are forbid in all cases of firm and obstinate obstruction, not to be overcome by the force of circulation. Hence in inveterate Scirrhoties, in Calculi firmly impacted in the biliary ducts, Emetics should not seem proper to be given; but as we have mentioned the uncertainty of the rule in these cases, it may possibly be liable to the same in others. Possibly in Scirrhoty, Vomiting not only extends its effects to the gland, but to the vessels in the place of the obstruction. This doubt should point out an enquiry into the use of Emetics in the case of scirrhus viscera. They have been known to be used with safety. There is one case, however, where caution ought certainly to be used with regard to them, *viz.* when the parts are lax and tender. In Scurvy, where there is a laxity of the vessels, and in Cachexy, where there is the same tenderness, Vomiting must then be hurtful, and accordingly Physicians observe, that they are dangerous wherever there are stagnating putrefactive humours.

2. Wherever there is an increased impetus already, we should judge *a priori* that Vomiting is hurtful; but as it cannot be proved that it increases the inflammatory diathesis, Vomiting may happen to be employed with safety. Dr. Robinson gives instances of inflammatory cases where it was useful. He seems, indeed, prejudiced, and I have not tried its effects, but I have seen it employed in Peripneumony and Pleurisy. Pleuritic pain was not increased by it, which seemed to depend on Vomiting stopping inspiration, in which that increase is felt; but still in other cases the Vomiting was hurtful, and much ambiguity occurs with regard to it, as I have learned from the practice of the person whom I mentioned as using Emetics in every instance. I should not think in topical affections that Vomiting without bleeding could be safely prescribed. It is not
used

used, as is agreed upon, in topical affections of the stomach itself, or in topical affections of the neighbouring viscera.

3. In Hæmorrhagy it is not certain whether it is salutary. Robinson, in his Essay on Emetics, maintains there is no more useful remedy in Hæmorrhage universally, and he gives examples of its good effects; and I have seen confirmation of what he advances. Practitioners have spoke of giving Emetics in spitting of blood. In the Infirmary I have exhibited them without bad effect, and perhaps it was for want of courage to continue them that they did not work a cure. There are certainly cases where they may be useful; and uterine Hæmorrhage has been cured by the *stibium ceratum* when it vomited; and I have employed Ipecacuan with the same effects as well as Dr. Robinson. In Dysentery the good effects of Emetics are certainly confirmed, and they may be here in the same manner.

All this contradicts our theory. It may be said, that in the time of Vomiting a constriction takes place over the whole body; but Robinson observes, that the circulation is soon encreased, which is certainly inconsistent with the cure of Hæmorrhagy. Robinson is of opinion, that Vomiting acts in consequence of restoring an equable circulation. I imagine something else must be taken in. In Hæmorrhagy, as Dr. Hoffman observes, a spasmodic affection often takes place, and Vomiting may act by taking off that spasm. This reasoning deserves at least consideration.

4. Emetics are very dangerous in congestions of the head, in apoplexy, palsy, and in smaller collections in the veins of the brain. Vomiting may be supposed to push such to the utmost violence, and to cause a rupture of the vessels on which they depend. Many, however, alledge they are useful. It may be said their constrictory power obviates their other effects. Indeed, I do not remember, in the annals of Physic, a fatal apoplexy produced by Vomiting. As

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this effect, then, is not to be expected, their other good properties may then take place; and I have seen instances of them; though in those instances they were exhibited much at random, nor can I particularize those in which they are proper.

From the whole of what we have said, it appears, that the bad effects of Vomiting are precarious, the good undoubted, and that its real virtue favours, in some measure, the supposition entertained by the practitioner we had occasion to mention, of their being a *panacea*.

PARTICULAR EMETICS.

Particular Emetics differ in degree of acrimony, and in extent of their effects. I have forgot to mark in my Catalogue the great variety of them, and their gradation. I should have mentioned *Warm Water*, which operates, from its bulk, in the same manner as cold water, and also from its nausea. Impregnated with oil, it becomes more powerful, and the same with bitters, and other nauseous additions. Next to these, Mustard and Horse-radish exceed in acrimony; and more acrid and more powerful than these are Squills, which indeed, if given dried, and in sufficient dose, are as acrid as any other emetics. After fresh Squills, and exceeding them in power, is to be placed Ipecacuan; and exceeding that again *Erigerum*, *Asarum*, and *Nicotiana*. With regard to the gradation of the three last, I am not certain; *Erigerum* is more mild than the *Asarum*. As to the rank of the fossil Emetics, neither am I certain with regard to it. I forbear to mention particular Emetics, because in doing so, I should only repeat what we have said on Emetics and Vomiting in general. None of them have a specific virtue. We shall take this opportunity to say something on Antimony, as its distinguishing property is its emetic power, although it might also have been referred to other heads.

A N T I M O N Y.

Antimony began very early to be the favourite of the chemical pursuits. It certainly affords us some very efficacious remedies, and this very efficacy of it was brought as an objection against its use, till of late these prejudices have been triumphed over, and its credit re-established; not but that even now it is attended with some doubts. I shall therefore bring to your view its various preparations, shew the foundation of each, and their relation to each other.

Antimony consists of a Regulus and Sulphur; this Sulphur was, for a long time, imagined to be of a particular kind, but this is now found to be erroneous; hence its peculiar medical virtues must reside in its Regulus. To procure this, various means have been thought of and practised, which is a proof of the confusion of their chemical knowledge. But they are all founded on the general rules applicable to the smelting of metals. We shall speak of two kinds. First, *Simplex*, with fixed Alkalies and Sulphur; or, secondly, *Martialis*, when with Iron.

The Chemists, indeed, have employed different metals, imagining they imparted different virtues to the Regulus, and even a combination of them; but the differences are rather in the quantity than quality of the Regulus; the prescription of the London College coincides with the first method, where the Black Flux is used. The Crude Antimony and the Flux are ground together, and then thrown, in small parcels, into a hot crucible; a deflagration ensues, and the Regulus is precipitated; part of the Sulphur is dissipated with the nitrous Acid, part forms a *Hepar Sulphuris* with the remaining fixed Alk. which dissolves some of the Regulus; for the purposes of arts, therefore, the Regulus is never prepared in this way, but by the other, viz. *Martialis*. Iron is here added to absorb the Sulphur; but if too great a quantity is added, the superfluity will unite with the Regulus. With regard to Iron, indeed, this addition would be harmless, but not so if we made use of other

metals. When we have thus got the Regulus pure, we have a substance capable of being acted on by the Acid in the Stomach, hence the *Perpetual Pills*, which are emetic and cathartic. This is the only shape in which the pure Regulus is employed.

Crude Antimony should, from a general principle, be inert, as we have said of Mercury, Sulphur, &c. but though experiment confirms that in general, and I have given it triturated to \mathfrak{z} ij. without any effect; I have no less seen it raise a vomiting, &c. like the other preparations. This we must account for from the different strength of the Acid in different persons, and in the same person at different times. Moreover, different portions of Antimony have different quantities of Sulphur, and it is alledged, that even the same cone differs in different parts of it, that there is more Sulphur at the basis than at the apex. Hence in prescriptions we have directions what part to take it from. From this uncertainty of the material circumstances necessary to its action, its crude state is looked on as an inaccurate medicine. To render it more certain we abstract part of its Sulphur, and that is done,

First, by Alkalies. If Crude Antimony is fused with four-fifths of its weight of common Salt, and one-fifth of a fixed Alkali, the Regulus falls to the bottom, and the Sulphur floats on its surface in form of *Scoriae*. This is the *Regulus medicinalis*. This was taken from a prescription in great vogue in Germany, called the *Febrifugium Cranii*. The common Salt is added only to float on its surface, and prevent the access of the air. This process has been variously diversified; some have chose to add vitriolated Tartar. The ready fusion of this is a curious circumstance; but the effect is similar to the foregoing.

Another method is the preparation of the Kermes Mineral. This was a curious secret in France, first invented by Glauber, afterwards in the hands of the Carthusians, at length the preparation was purchased by the French King, and made known.

A quan-

A quantity of Crude Antimony is boiled in a lixivium of Salt of Tartar; the Sulphur forms a Hepar with the fixed Alk. and suspends part of the Regulus. When this is decanted and set to cool, part of the Regulus with its Sulphur falls to the bottom in a red powder. The quantity of Sulphur is not, however, sufficient to prevent its being acted on by the Acid of the Stomach.

The *Sulphur auratum Antimonii* is of the same nature, but milder than the foregoing. There are various ways of making it; one is of taking the scorixæ of the *Regulus simplex*, and putting them into boiling water; on cooling it falls down in a powder. The Chemists thought this too simple a process, and hence thought proper to add Acids, which precipitate the Sulphur in greater quantity, but of less efficacy, and less impregnated with Antimony. But there is no certainty in any of these; for they will vary according to the different times of the precipitation; the different subsidations of the same process should be intimately mixed; but we never can be sure that we have the same power in different preparations.

Antimony is likewise deprived of part of its Sulphur by Nitre. I am not certain of the accuracy of attributing this separation to the Nitre, but it is rather owing to the action of its parts separately, in the decomposition of it, when the Acid carries off part of the Sulphur with it, while the Alkaline absorbs the rest, and forms an Hepar Sulphuris. This process is diversified according to the quantities of Nitre used. If we use an eighth part we obtain the *Crocus Antimonii medicinalis*; only as we increase the quantity we make the preparation more and more acrid, till we arrive at equal parts of each, which is the *Crocus Metallorum*. If we go on increasing the Nitre it grows milder; on the opposite side, if we use one and a half of Nitre to one of Antimony, we obtain the *Crocus Metallorum mitis*; if two parts of Nitre to one of Antimony, we obtain the *Pulvis Corrichius*, or James's Powder, or the Emetic Nitre of Boerhaave.

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I never could discover the power of diaphoretic Antimony; for three parts of Nitre will render it an inert substance. I believe we should to four of Antimony take only seven, perhaps six and an half of Nitre; nay, perhaps only six; we may then get a powder that will act as an Emetic and Diaphoretic; but it is not reduced to any proper standard.

Secondly, By Calcination. If we treat it with a heat less than is necessary for its fusion, we do much the same as by adding Alkali, *viz.* destroy part of the Sulphur; but as we continue to evaporate more Sulphur we calcine more of the Metal, and during the calcination something is added to the Metal from the fire, which renders it inert; but if we afterwards increase the fire suddenly, we bring it to a glass, and in that state it is capable of being acted on by all the Acids.

Thirdly, By Sublimation. The *Flores Antimonii* are procured by joining aludels to each other, and then subliming the Antimony. In the farthest aludel we shall find most Sulphur, in the nearest most Antimony.

OF REGULUS of ANTIMONY combined with ACIDS.

With the Muriatic. Antimony may be combined with this in different ways, but not conveniently, unless it is in a concentrated form. Different compounds are therefore made use of for this purpose, but chiefly the Corrosive Sublimate. In this case the Muriatic Acid joins the Antimonial Regulus, while the Mercury unites with the Sulphur. In distilling this we procure the Butter of Antimony; on repeating the distillation it comes over thinner, under the name of *Oleum Antimonii*. If the operation is urged farther, the Cinnabar of Antimony comes over, which has really no Antimony in it, and only the properties of common Cinnabar, and equally inert. I know no alteration that is made by uniting it with any other salts that contain Muriatic Acid. We may treat it
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with Sal Ammoniac in the same manner we mentioned of Mercury. When thus united with the Muriatic Acid, it is one of the most corroding substances we can apply to the body, and only used in this fluid corrosive form externally. For internal use we must abstract a part of its acid; this is effected by adding water; the most soluble and acrid part is accordingly dissolved, and part of the Antimony precipitates, which is absurdly called the *Mercurius Vitæ*.

Stahl recommends ardent Spirits instead of Water; this throws it down in a finer powder, but I know not that it has any other effect on it.

The Chemists have proceeded to the calcination of it, in order to dissipate more of the acid; and I see from Senac, that it has been used in this way, though I know of no particulars relating to it.

Of its UNION with the NITROUS ACID.

First, Antimony, if calcined with Nitre in this proportion, *viz.* three parts of Nitre to one of Antimony, the Regulus is fully saturated with nitrous Acid, and forms a diaphoretic Antimony inert, and not soluble in our fluids.

Secondly, By adding Nitrous Acid to Butter of Antimony, it attracts the Regulus from the Muriatic Acid, but only corrodes it, and brings it down in the form of Bezoar Mineral.

This is perfectly inert, from the superfluity of Nitrous Acid, and cast out of our Dispensatory.

Its UNION with the VITRIOLIC ACID.

It precipitates the Regulus from the Nitrous Acid, and has much the same effect. It is not used.

With the VEGETABLE ACID.

This Acid will act upon Antimony in its crude state, if its sulphur be in some measure abstracted. The action of this Acid is observ-

observable, too, on the Regulus, or when the crude Antimony is a little calcined, or in its vitrified state, or when precipitated from other acids; the effect of all these is the same when acted on by the Vegetable Acid. We generally use the acid in a dilute form, *viz.* that of wine, as in the *Vinum Antimoniale* and *Benedictum* of the shops.

The spirituous strong Portuguese wines are not so good for this purpose; the lighter French wines, or the more acid, as the Rhenish, make a stronger solution of it, and our own home-brewed wines exceed either. For these reasons I am often disappointed with the *Vinum emeticum* of the shops, while that of our Infirmary never deceives me. Vinegar might, perhaps, answer better, and, brought into a proper form with syrup, might make an elegant prescription. The Acid attracts it in very small quantities, and always in a certain proportion, so that the quantity and concentration of the Acid being given, the strength of the medicine is known. One ounce of *Crocus Metallorum*, or Glass of Antimony, may serve an Apothecary his life time, and an ounce of the wine is the general dose.

To get it in a more concentrated state we employ Tartar. We dissolve in water as much Tartar as we can, by the assistance of boiling, and then add Crocus, or Glass of Antimony; on cooling it falls down in crystals, and forms the *Emetic Tartar*. This method of crystallization is precarious, and cannot well be practiced; we therefore evaporate to dryness, and afterwards blend the whole by trituration. It is not easily soluble in water, the more saline part will be taken up, and the more antimonial left; to obviate this the French have used the Soluble Tartar, and thus they may give it in drops.

Of the MEDICAL VIRTUES of ANTIMONY.

Antimony is purely stimulant, it no where shews any astringent, tonic, or sedative power, or, if it ever does, it is in consequence of its stimulus. It certainly stimulates very readily, as a very small quantity will act as an Emetic. It has long been a great desideratum to get a preparation that would act on the other parts of the system

system without this effect. When it passes the stomach, and acts only on the intestines, it acts as a Purgative. I doubt much if it acts as a Diuretic or Sudorific by being properly applied to the organs of these evacuations, and rather imagine that it produces these effects by acting on the stomach and intestines. It is difficult to conceive this, though we evidently see its effects on the surface or kidneys, sometimes before it can possibly have arrived there. Other Emetics certainly do the same.

It is certain, from matter of fact, that, from its action on the surface, it can both stimulate and relax the vessels on the surface of the body, but this is common to it with other Emetics, to produce constrictions on the surface, and hence its service in hæmorrhages; that, however, is in consequence of the nausea it creates.

Of its FEBRIFUGE QUALITY.

It is no difficult matter to shew testimonies of efficacy, adduced in favour of the most inert medicines. But I allow that practitioners of candor and discernment acknowledge the virtue of James's powder; and, indeed, the *Pulvis Cornachini* and *Antiquartzium of Riverius*, medicines of a similar nature, have been extolled with the same commendations. I imagine, that, by acting on the stomach, it produces a diaphoresis, by relaxing the spasms that take place on the surface. But what is the proper form in which it should be exhibited? Such a proportion of Nitre seems to be necessary as will leave it to be acted on by the acid of the stomach, and that stimulus should not be too great, but that it should suffer it to pass into the intestines. For this purpose Cornachinus adds Scammony, and James adds Mercury, viz. a preparation of it in the Nitrous Acid. But the Tartar Emetic is as much in use as any of them, and is at present the favourite Febrifuge in France and England, when joined to Glauber's Salt to inforce its action. The action of the Tartar Emetic is much slower than that of the *Vin. Emeticum*, hence preferable, as it is longer before it produces a nausea. It may be conveniently given in form of a bolus.

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CATHAR-

These are medicines which evacuate by stool. They are called Cathartics, or Purgers, by way of eminence, from a gross view, they being supposed to carry off all the impurities of the body; but the term must be considered only as metaphorical. Here, as under the head of Emetics, we shall mention the effects of the medicines at present.

1. They evacuate the ordinary contents of the Intestines. As this is a necessary operation of the animal œconomy, and not occasional and accidental, as in the case of vomits, they have been considered as medicines friendly to nature.

2. Besides evacuation, by exciting a more active peristaltic motion, Cathartics squeeze out the glands of the Intestines, and occasion a greater afflux of intestinal liquors, &c.

3. As operating on the whole alimentary canal, they draw also from the Stomach. Whether it is peculiar to any to be stomach purgers, we may afterwards consider. From all these considerations, their evacuating property must be very great.

4. They also evacuate the whole glands of the Intestines, and those which pour their liquors into them, particularly the pancreas and liver, by expediting the circulation, in which last they have effect on the spleen, and all the abdominal viscera. If there is a certain connection between secretion and absorption, by encreasing the former they promote the latter. Hence they are called Hydragogues, not only as evacuating, but occasioning the absorption of water which has stagnated in any cavity.

From this view of their operation our medicines might be considered as Cathartics in general, and if the evacuation be continued
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for a length of time, they may most certainly purge. But this constant evacuation is not to be supported except by repetition of acrid medicines, which is a dangerous practice, and only to be applied to bodies of a lax flaccid kind, so that still we must refuse them as general purgers. Upon this plan we may object to their use in the *Lues venerea*, and I doubt whether we can ever continue them so long without danger, as to change the whole mass of fluids. Hence the discharge by salivation, urine, &c. is preferable. You see even the same objection holds against Salivation, and this because both are attended with inflammation of the parts where the medicine is collected and applied.

5. The evacuation by stool, and derivation to the intestines, necessarily determines more blood into the descending aorta, where, in consequence of the revulsion from the head, I have no doubt of their encreasing every evacuation, so that, therefore, Cathartics may very probably be considered as promoting the menstrual flux, opening obstruction in the uterus, and useful in washing off the virulency of *Gonorrhæa*, useful in Ulcers, by evacuating the system in general; to Ulcers in the inferior part of the body, as causing a greater flow to the part.

6. Cathartics have a stimulant power, which, as applied in the intestines, excites or at least aggravates inflammation in them; nay, some of them there are which will propagate the same over the system. Again, there is hardly a purgative, which, conveyed into the mass of blood, is not diuretic and pectoral. These are in general the operations of Cathartics.

As repeated Emetics weaken the stomach, so Cathartics often renewed, diminish the tone of the intestines, and their sensibility, and so,

1. Partly by this, and partly in consequence of mere evacuation, their frequent use renders the intestines very liable to irregular spasmodic affections.

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2. Of

2. Of most Purgatives the acrimony is of an inflammatory nature, not only exciting inflammation in the part to which they are applied, but acting in the same manner as poisons. Narcotics, as the *Nicotiana*, are accounted purgative, much oftner are Purgatives narcotic.

3. The inflammatory stimulus is extended to the system, and produces or aggravates Fever and inflammatory Diathesis.

4. Their inflammatory stimulus is directed to the *rectum*, through which the whole acrid matter must pass. Hence all Purgatives encrease hæmorrhoidal swellings.

5. They not only inflame the *rectum*, but also extend the irritation to the *urethra*. These effects are varied in particular cases. This finishes what we were to say on the good and bad qualities of Cathartics in general.

PARTICULAR CATHARTICS

are of two kinds. Acids poured more copiously into the bile, give it a purgative quality, and the same effect will ensue from a more copious Acid produced in the stomach passing into the intestines. The two kinds of Cathartics then, are, 1. Acids, or acescent aliment; 2. Medicinal stimulants, whose acrimony is fitted to purge.

The *Fructus acido dulces*; *Prunes*, *Tamarinds*, and *Cassia*; *Serum lactis*, *Lac ebutyratum*, and *Olera blanda*, have all their chief effect in consequence of their acescency in the stomach. In so far as they contain sugar, they stimulate the intestines, which we may conclude from the effect of sugar itself applied in glysters.

Medicinal Stimulants differ greatly in their degree of acrimony, and so in their purgative effects. It were proper to arrange them
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in this order. First, I would put *common water*, which, in considerable quantity, is purgative, operating by its bulk, stimulating the peristaltic motion, thus pushing forwards the contents faster, and evading the absorption by the Lacteals. Thus many Mineral-waters act.

Next I would insert *Bland expressed oils*; these, when taken in such quantity as to evade changes in the stomach, may prove laxative, but, like water, I believe it is chiefly from their bulk. Simple Oil is employed in the *Colica Pictonum*. I have seen it given in the quantity of ℞j. but its action seemed always to be in the way we alledge.

After these we may place *Soap*. With regard to the operation of this, I am doubtful. Though mild to the taste, it has the power of stimulating the intestines, and proving purgative. This it will sometimes do in the quantity of ʒj. and at other times the effect is not considerable from ʒiij. This has led me to imagine, that Soap has no effect but when decomposed in the stomach. Soap, as contaminated with common salt, may owe some of its irritability to it. Accordingly, upon using the Soap made from Lewis's direction, without common salt, I never found it purgative.

Following this I shall mention *Sulphur*, which, in its perfect state, is mild and bland. The theory of the action of this is as difficult as that of Soap, for, in spite of its mildness, it is stimulating to the intestines. Whether our fluids have the power of dissolving it, I cannot say. It is certainly a mild and safe Cathartic, never producing any considerable evacuation, but keeping up the natural excretion without any irritating or heating effects. I have frequently had occasion to employ it, where irritation would have been harmful, and costiveness encreased the disease, viz. in uterine hæmorrhoidal hæmorrhagy, and there it was effectual without inconvenience. Sulphur has been accused of griping, but I imagine this is owing to its having suffered that deliquescence to which we
know.

know it is liable; for in that condition its purgative property disappears, and the griping takes place, which gives us a caution to use our Sulphur always in a mild state, or previously to wash it.

I must here insert one or two medicines, of which I am not certain whether they be entirely in their place. *Mustard* is capable of stimulating the stomach and intestines. Its effect, as a purgative, is only to be obtained when it is entire, and then given in the quantity of $\mathfrak{z}\text{ss}$. or $\mathfrak{z}\text{j}$.; if not purgative, it keeps up a regular excretion.

Next I would place *Bile*, which, as suited by nature to promote evacuation, might be supposed to have that effect when introduced into the body in a larger proportion. Accordingly it has been recommended. I have made experiments with it; but whether it be that Bile has really no effect, or whether I may have fallen short of the proper dose, it is certain I did not succeed with it. I gave inspissated Bile in the quantity of $\mathfrak{z}\text{ss}$. but on continued practice never found from it any sensible effect.

Approaching next to these mentioned in mildness are the *Saline Purgatives*, and of these, in the first place, *Sugar*; and, connected with it, *Honey*, *Manna*, and the *sweeter Fruits*. Indeed their purgative quality seems somewhat contrary to their Sugar; those containing most of it not being so purgative, as Tamarinds, &c. Hence I would say, that none of these can be conveniently employed, except where we may put up with the effects of acedent fermentation.

Next in order come *fixed Alkalies*, of which we have formerly spoken.

Tartar acts more considerably by its neutral qualities, and the *Magnesia Alba* is only purgative as converted into a Neutral, so that this is the proper place for considering *Neutral Salts in general* as Purgatives, and for marking out their peculiar differences. The
fixed

fixed Alkali is only purgative as converted into regenerated Tartar.

Where acidity prevails Magnesia is preferable to other Neutrals, but it is uncertain whether it is so to other absorbents.

Neutral Salts taken internally stimulate the stomach, excite appetite, and promote digestion; hence the term *digestivum* applied to one of them. Since Neutral Salts are directly stimulant, as we see by their effects on the stomach, and by their sometimes producing vomiting, we give them in divided doses. Some of the Neutral Salts, however, are remarkably antiemetic, sedative, and refrigerant. Hence their use in fevers, inflammations, and hæmorrhagy. When used frequently, or in large quantities, they impair the tone of the stomach, bring on flatulencies, and weaken the intestines, as is seen by the frequent use of Nitre, Glauber's Salts, &c. They have in some degree a sedative power, and sometimes a diaphoretic one, which they exert in the same manner that a draught of cold water does. They are of use in the cold fit of an ague, by promoting a critical diaphoresis. In like manner they stop vomiting, by determining to the surface of the body. Custom has given a preference to the Neutrals made with native vegetable acids, before the artificial, as Vinegar, but I know not upon what foundation. It is observed, that the Neutral made with the Volatile Alkali, as an antiemetic and sudorific, is preferable to regenerated Tartar. When admitted into the intestines they act as purgatives, and pretty sharply; and hence, from the quantity and * suddenness of the evacuation, useful in feverish disorders. However, their stimulus is inconsiderable, and is not extended, as in most other purgative medicines, over the whole system. Their † relaxing qua-

* Hence those Neutrals that are the most stimulant, as those of the muriatic kind, are thought best in Fevers.

† Hence perhaps one of their uses in inflammatory complaints. They have likewise a sedative power.

lity makes these Salts improper for those who have a lax tone of their stomach, as hysteric and hypochondriac persons. In obstinate costiveness they are given in small quantities, *viz.* one quarter of a dose in an hour, until the quantity of two or three doses are taken, and this often with the best effect. All Neutral Salts prove purgative; but as soluble Tartar has no disagreeable taste, it should be, on that account, preferred, was not its operation so very precarious, as the acid of Tartar is separated from its Alkali by every other acid, and hence would be decomposed by the acid of the stomach. Hence it is generally given as an absorbent. As the quantity of fixed Alkali is but small, it will not be very purgative by the effect of the Acid it finds in the stomach, as this combination is less stimulant to the intestines than soluble Tartar. Regenerated Tartar has no peculiar efficacy, and when exhibited requires a large and expensive dose. Vitriolate Tartar is given as a purgative, in doses from two to four drachms, but neither this, nor the *Sal polyebresum* is often used, on account of its difficult solution in water, and the great increase of the bulk of the dose on that account.

Hence Glauber's Salt is preferred, which, though of easy solubility, have a most nauseous taste, but this may be in some degree alleviated, by the addition of Aromatics, among which I think nutmeg has the best effect, with some sweet substance added to it, which would coincide with the purgative intention. I find but little difference between the medical effects of the true, and the Magnesia Glauber's Salt. Neutral Salts, though in the largest quantities we could exhibit them, when diluted, can have very little effect upon the fluids as introduced into the body. Some have alledged, that they cool and allay the heat of the blood, because all the Neutral Salts, when powdered, and thrown into water, generate cold. But it is only during their solution that they have this effect; so that they would be most likely to exert these effects, if given in form of a bolus, as, when the Salts are already dissolved, they have no farther effect in producing cold. Perhaps by their cooling power they may shew some small sedative effects on
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the stomach, but these would be trifling. Their antiseptic quality is very small. But although they cannot much affect the mass of blood, they shew very considerable effects on the secretory organs, and hence very powerful diuretics and diaphoretics. On this may be founded the virtues of many Mineral Waters impregnated with Neutral Salts.

All the medicines hitherto mentioned are *Eccoprotics*, or those laxatives of a more gentle and cooling kind. All those afterwards to be mentioned must be considered as having an inflammatory stimulus, though still we are to speak of a few which must be separated from the acrid Purgatives.

All those plants enumerated formerly under the title of *Amarica*, are more or less purgative. *Chamæmile flowers* are so much so, that this quality is the chief hindrance of their being effectual in Intermittents.

More powerful than those may be considered the *Fætid gums* enumerated among the Antispasmodics. In their purgative effect they all approach to the nature of *Aloes*. Though the fætids just now taken notice of are Bitters, tho' the Bitters mentioned before them are purgative, and though Aloes be bitter, yet a Purgative is not a common quality in Bitters, and therefore in Aloes, &c. is to be considered as a peculiar property.

A L O E S.

If any medicine be entitled to the appellation of a stomach purge, it is certainly Aloes. It is remarkable with regard to it, that it operates almost to as good purpose in a small as in a large dose, that five grains will produce one considerable dejection, and twenty grains will do no more, except it be, that in this last dose the operation will be attended with gripes, &c. Its chief use is to render the peristaltic motion regular, and is one of the best cures of ha-

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bitual

bitual costiveness. There is a difficulty we meet with in the exhibition of Purgatives, *viz.* that they will not act but in their full dose, and will not produce half their effect if given in half the dose. For this purpose we are chiefly confined to Aloes. Neutral Salts in half their dose will not have half their effect, although even from these, by large dilution, we may obtain this property; but besides them, and our present medicine, I know no other which has any title to it, except Sulphur. Aloes sometimes cannot be employed. It has the effect of stimulating the rectum more than any other, and with justice has been accused of exciting hæmorrhoidal swellings, so that we ought to abstain from it in such cases, except when we want to promote them. Aloes has the effect of rarifying the blood, and disposing to hæmorrhagy, and hence it is not recommended in uterine fluxes. Fœtid gums are of the same nature in producing hæmorrhagy, and perhaps this is the foundation of their menagogue power.

B A L S A M I C S.

These have the power of stimulating the intestines, and are next in virtue to Aloes, being very proper to overcome a costive habit, and peculiarly useful where the costiveness is attended with great spasms, as in the dry belly-ach; they are more heating to the whole of the system, and produce more copious evacuations. Of these the whole variety, as Turpentine, &c. may be used. Turpentine, on account of its difficult diffusibility, is not very proper. The most convenient, and perhaps the most efficacious of all, is Gum Guaiac, which is found an useful Purgative in all cases of obstinate Costiveness, where there is no danger from its heating quality. We are apt to miss the effects of this in a solid form, and therefore it should be well dissolved in mucilage, or yolk of egg. With sugar it is not so effectual, depending more on the solvent powers of different stomachs.

Before we come to the Purgatives which may be properly stiled acrid and stimulant, we shall just mention a few mild ones, set down

down before the former, which was done with some view of inserting them according to the order of their virtues.

Of *Violets* and *pale Roses*, the purgative virtue is little to be depended upon.

Polypody has inconsiderable effect as an aperient Purgative. It does not operate in the dose of $\mathfrak{z}\text{j}$, so that exhibition in large quantities is necessary to its operation.

All the Purgatives inserted in our Catalogue, after the title *Antispasmodica*, are,

Acrid Purgatives, of which *Materia Medica* writers say very little but what concerns their natural or chemical history. With regard to the first, we have, in general, purposely avoided it. Little has been obtained from the chemical history, nor is it yet determined in what substance the medicinal powers reside. Not one of the analyses are perfect, and those who have made them, *e. g.* Boulduc, Neuman and Cartheuser, are contradictory to each other. They differ only as more or less acrid, from the different degrees of which acrimony and stimulus, they have been distinguished in Cholagogues, Phlegmagogues, and Hydragogues.

Rhubarb has, besides its purgative quality, an astringent one, and hence is peculiarly adapted to the dysentery. It also has a bitterness joined to it.

Seneka affects the stomach, intestines, and excretories. In order to make it prove purgative or diuretic, it should be given at intervals, largely diluted.

Genista is frequently recommended in dropsies. It is an useful diuretic. $\mathfrak{z}\text{ss}$. of broom tops, managed like Seneka, will produce the same effects. Ascites is accompanied with flatulency. Purgatives that expel wind are the best in that disease, and the *Genista* answers that purpose.

Senna. Whether there be any foundation for this being one of the best purgatives, I cannot say, nor have I been able to find it. It is as acrid and inflammatory as any. It ought to be infused in a large proportion of water, which is preferable to decoction, in so far as the purgative quality resides in a volatile part, which flies off by the treatment. This volatile part, obtained by the largely diluted infusion of *Senna*, is that whose operation is most gentle and easy. Juice of Lemons and Cream of Tartar correct the bitterness of our present subject.

Helleborus niger is commonly placed among the most acrid purgatives. It is to me a medicine of uncertain qualities. As employing it in infusion or extract, I have been disappointed of its effects as a purgative at all. It has also been recommended as a powerful emmenagogue by Dr. Mead, but I have never met with instances of its efficacy.

The five next are all species of the same genus, the *Convolvulus*, and are exotics. Our common *Convolvulus* deserves a trial, to see if it possess the same virtues.

Mecboacan is remarkably mild, with little sensible taste.

Jalap is neither more violent in its effects, as a purgative, than *Senna*, nor is it so griping. If any purgative be diuretic, this is remarkably such, when treated like *Seneka* by decoction, which dissipates its virulent acrimony.

Scammony has been always placed among the acrid purgatives. Its taste is not very disagreeable. It requires to be diffused in water; is frequently adulterated; I imagine it has something of the nature of aloes.

The purgatives that follow are more acrid than those we have mentioned, but none of them have any specific powers.

Colocynthis, *Cucumis Aspinus*, and *Elaterium*, to which might have been added *Bryonia alba*, belong to the natural order of the
Cucur-

Cucurbitaceæ. Their virtues reside more or less in a volatile part, and their effects are obviated by boiling.

The metallic Purgatives follow next.

Gold. This is not active in its metallic state, or when taken up by oils, but very much so in its saline state. For this it must necessarily be dissolved in *Aqua regia*. It is a strong caustic, whether used in the solution, or a precipitated or dry state. It may be brought into a dry form two ways; first, either by evaporating to dryness; or, secondly, by precipitation with Alkalies. In the latter state it is called *Aurum fulminans*. This was in great vogue, but its certain effects are not known. It has been sometimes employed with advantage, and in other cases done harm. The *Pharmacop. Edinensis* used it after washing it from its acids; but in this state, though not soluble in watery fluids, yet it may, like other precipitated metals, be acted on by the weaker acids, as that of the stomach. Hence its action would depend, in a great degree, on the quantity of acid present there, and hence too are derived the various accounts of its effects. In general it acts as a purgative, sometimes as a diaphoretic, and, like other metallic preparations, is also anthelmintic. It may be easily over dosed, and at best dangerous, and therefore very properly left out of the *Materia Medica*. Geoffroy's way of preparing it was to evaporate a solution of Gold to dryness, and then to triturate it with regenerate Tartar, by which it became soluble in ardent spirits. The theory of this is very difficult.

Silver. This metal is inactive in its metallic form, nor can it be rendered saline by the acid of the stomach, unless when precipitated from the Nitrous Acid, and this should be pure and without any admixture of the Muriatic. Two parts of water added to Glauber's Spirit of Nitre is the best proportion. A solution of Silver in the Nitrous Acid, evaporated, fused, and cast into a mold, gives us the lunar caustic. This is often employed externally as a caustic, but
where

where a quick effect is desired, it does not succeed so well, as it is deliquescent. It is useful as a styptic, and may answer as a detergent. Internally it may be of service, when the crystals are rendered milder, by extracting part of the acid. Lewis, in the New Dispensatory, has given the best directions for this. It has been employed chiefly as a Purgative. Boerhaave and Boyle recommend it much in hydropic cases, as evacuating the contents of the viscera by stool and urine with great ease, but a long use of it hurts their tone. I have tried it, but have not found it answer; it required considerable quantities, and was far from acting easily.

Ward used to give an hydropic purge, which acted much in the same way they speak of this. That published in his book of Receipts, with many others, are probably very different from those which he himself used.

Mercury and Antimony have been before treated of.

DIURETICA.

The effect of Diuretics is very uncertain. Many medicines are enumerated as having a diuretic quality, but there is not one of them that exerts it always, nor any to a considerable degree. There is not a more powerful stimulus to the kidneys than Cantharides, and yet even the effect of these was not steady, although at the same time I have seen them produce a strangury. Dr. Ward's powder is the only certain Diuretic. This is probably owing to the diffusion which all the medicines passing through the mass of blood are liable to, and also from the medicines mentioned by *Materia Medica* writers relieving only diseases of the kidneys. There is evidence of many Astringents, besides the *Uva Ursi*, being in the list of Diuretics. A Physician wrote a Dissertation, published forty years ago, entitled, *De Calculo Astringentibus curando*, and I do not doubt but Astringents may sometimes promote this evacuation. I am told that Storck, in a late book, his *Annus Medicus*, recommends several Astringents, in obstinate cases of the *Colica*

lica Pittonum, which sufficiently shews the uncertainty of the operation of any medicine.

The operation of Diuretics does not depend on their changing the consistence of our fluids, and I have no doubt in saying, that universally they act either by a stimulus directly applied to the kidneys, or to the parts consenting with them. That the kidneys may be affected by consent, appears from there being a copious flow of limpid urine in hysteric paroxysms, in the same manner as nephritic affections cause vomiting. It is from acting in the Intestines that purgatives, I imagine, exert their diuretic power, at least it is very doubtful if it be not so, since stones in the kidneys cause Colics. Commonly, and perhaps properly, the stimulus of Diuretics is supposed of a saline nature; but I would by no means confine it to this. Any Acrid will do, and there is Acrimony of an oily kind, and others with which we are not acquainted.

As to their general effects :

1. They evacuate water from the blood-vessels, and by the evacuation causing an absorption, water accumulated in any quantity and stagnating in the cavities. Hence they are supposed to cure Dropsy, but their stimulus is generally but gentle, and we succeed less often than we would wish or imagine.

2. They evacuate with the water, the saline, putrescent parts of our blood, and hence all Diuretics are antiscorbutic; and the contrary.

3. With these Diuretics wash out all the extraneous bodies in the serosity. Hence they may be useful in evacuating every sort of Acrimony.

If their operation were certain, this class of medicines would be of infinite advantage; nay, they may often be so without any sensible effect, for every Diuretic is a Diaphoretic. In order to expedite their operation, it is always proper to throw in much water, which

which may run off by the serous excretories. The only exception to this is the case of Dropsy, but even here we are not certain. We have had lately an instance, in this place, of a woman labouring under an Anasarca, and seemingly an Ascites, which has resisted every medicine, who, by drinking largely of a mineral water, brought on a great flow of water, and was relieved. There are instances in physic of a cure performed by common water, but still the case is doubtful.

PARTICULAR DIURETICS.

Of the vegetable Diuretics I have marked two natural orders.

1. The *Umbellatæ*, which have universally a diuretic power ascribed to them. Their effects are never very evident, although, like the *Cicuta*, they may be useful without these being sensible. I have set down such as are most employed, but cannot say how far the choice is accurate.

2. *Stellatæ*. The whole of this class are astringent, and it is to this property that their diuretic virtue, if ever they exert it, is, I imagine, to be imputed. Although these are the only natural orders particularized, yet under the title *Stimulantia*, referred to, will be found the *Siliquosæ*, &c. with which I might have increased the list, as every one of them is famous in this way.

What follow next are a *Miscellaneous Set*, put together from various sources, upon very uncertain foundation, except with regard to a few.

Ajarum, *Genista*, and *Seneka*, are mentioned, to show that all Emetics and Cathartics, by proper management, may be rendered diuretic. Thus Ipecacuan, by strong coction, will lose its emetic, but reserve a diuretic power.

Abfynthium, *Carduus*, *Ruta*, &c. are all, on many occasions, evidently diuretic; but without any pretensions to saline acrimony.

With regard to the rest, hardly any particular marks need be made.

Dulca-

Dulcamara is a species of *Solanum*, and of the nature of it and the other *Luridæ*. Its berries are narcotic, which the leaves and bark are, in a less degree, with the addition of a purgative virtue. The woody parts are least narcotic, somewhat purgative, and more diuretic. The use of this has lately been restored by Linnæus, who gave ʒij. of the *Stipites* in decoction, which he and his compatriots recommend as a cleanser of every acrimony in the blood.

Saline Diuretics. The increase of urine is never very remarkable from these, except when the salt is accompanied with a large quantity of water, to which the increase may be greatly imputed. The most powerful of the Saline Diuretics is the Caustic Alkali mitigated with Acids, and perhaps more effectual when joined to the Bitters, the virtues of the one mutually encreasing, and being encreased by, the virtues of the other.

D I A P H O R E T I C S.

These are properly of two kinds; 1. Those strictly so called, which promote insensible perspiration only; 2. Those which cause sweat. Of the Diaphoretics, strictly so called, as the effect is not evident to the senses, and seldom tried by statical experiments, our knowledge is not accurate. We have only account of one by Santorius, viz. *Assa Fœtida*.

As to their general effects, they are analagous to those of Diuretics. Sudorifics act thus sensibly, and so have been employed in Dropsy, but their use is uncertain, as the means employed to obtain their operation excite a fever, which is not always safe. They especially evacuate every putrescent part of the blood, every acrimony generated there, and every extraneous matter. We are more certain of this operation, by making external assistants concur without internal Diaphoretics. Here we should suppose, as the action is more extended, that a more copious evacuation is made, and more convenient, as we can in some measure secure it, when these means are not hurtful with regard to the disease we could cure. In the Scurvy, Sweating would be hurtful, and a Diaphoresis is only proper. In the *Lues Venerea* Sweating has peculiar advantages.

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tages. It can be kept up more steadily than the evacuation by stool, and more conveniently than salivation, and if it could be excited with ease, is certainly the best method of cure. Sweat is the only excretion, which, independent of particular stimulus, merely follows the increase of circulation, which connection seems to have been established by Nature, in order to obviate the effects which would arise from heat, motion, &c. and hence Sweating might cure Fever, without having recourse to the evacuation of any particular matter. Fever is always found in a constriction of the surface of the body, and if this be granted, it is plain the relaxation of the constriction may take it off. Hence there is no doubt but Sweating may cure Fever, but whether at all times it is proper, I will not say. It is alledged, that if we can bring out a Sweat in the beginning, we may obviate any Fever; but this needs confirmation, and I do not agree to it. Certain, however, it is, that the case is often thus. Some are of opinion, that Sweating may be used during the whole course of a Fever, while others think it ought only to be employed in the beginning. This discussion we cannot enter upon at present. To determine when and where they should be exhibited is very difficult, but it must be admitted, that in many cases Sudorifics are useful.

Sudorific power and sudorific medicines are of different kinds. All general Stimulants of the system, as motion and heat, are powerful Sudorifics. The last seems to concur with the others I am to mention. Particular Stimulants may be of two kinds; 1. Those which are applied to the excretories themselves; 2. Those applied to parts consenting with them, as the stomach and intestines.

In the next place, Sudorifics may be Antispasmodics. These are of two kinds; 1. The Sedative and Narcotic; 2. The Antispasmodics, strictly so called. The first relax the smaller, and give a stimulus to the larger vessels. The second are such as we are not certain by what power they act.

With regard to all of them, we had occasion to mention them before. We have only one thing to observe. Stimulant Sudorifics

rifics are only to be employed as Evacuants, when there is no feverish Spasm, except to obviate the Spasm at an intermission, or when the antispasmodic virtue is in considerable proportion, because febrile Spasm is not to be overcome, but aggravated, by increasing the circulation. This especially takes place with regard to inflammatory Spasm. In order, therefore, to proceed safely, we must use Antispasmodics. Whether or not these are so with regard to inflammatory Spasm, as is alledged of Camphire, I shall not determine, but undoubtedly this, Musk, &c. are useful in the feverish Spasm, and where Nature points out a remission and accession, and then may safely be employed.

M E N A G O G A.

In concluding our last head, we were engaged in a difficult subject, and at present we enter upon one of the same nature, in the consideration of Emmenagogues, for there is not an indication which we have less in our power. It differs in this from the other evacuations, that we never think of increasing it above its natural quantity, or of applying medicines but to overcome its obstruction. Hence, medicines on this head must differ as the cause of obstruction differs.

1. Nothing has been more common than to suppose the menstrual flux depending on an universal plethora, so that a defect of it must depend on a defect of fluids, and whatever restores the plethora must restore this. But in my opinion this cannot be the case, for the flux often goes on steadily and regularly where this defect of fluids in the system takes place.
2. A certain lentor and viscosity of the blood has been reckoned a cause of the menstrual flux. Against this I would alledge, that the presence of such an actual lentor has never been proved, and although it had, it is very unlikely that it should ever affect the lax dilatable system of uterine vessels.
3. With more probability has a defect of motion, as it is often apt to occur in the weak, as in the case of Chlorosis, and where there is a weak system of the uterus. But still there is an uncertainty here, and it is doubtful of the weakness and obstruction, whether is cause or effect. To remove the disease, however, it is necessary to

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remove the flaccidity. 4. But the most obvious cause is the constriction of the extreme vessels, the *contractio vasi propria aucta*, which is often produced by cold, passions of the mind, &c. for suppose we should admit the weaker impetus, it could not have the effect, unless as it gives an opportunity for a strong stricture in the extremities. Hence Menagogues may be considered as of three kinds.

1. Astringents, in so far as they can be employed to restore the tone of the system, *i. e.* such as produced a constriction, which does not go so far as a spasmodic affection, but increases the impetus of the system. Almost all of these have been, at different times, employed. I have only set down Iron as most commonly in use. Probably, by introducing it in small quantities, and at intervals, it might be made to act as a tonic. The astringent Bitters, as the Bark, might be employed for the same purpose.

2. Menagogues may be Stimulants, of which there are of different kinds. 1. Such as act on the system more generally, and only indirectly encrease the impetus of the blood in the uterus, as externally the Cold Bath, and internally Mercury, which produces brisker oscillations in the extreme vessels of the whole system. 2. Stimulants may be such as act on the uterus itself. These have been supposed such as act specifically upon the uterus. Specific stimuli to the secretions can be explained, but such explication cannot be given here; and I would alledge, that none such are yet shown, and that the direct stimulants of the uterus are only the external. There is no doubt but application might be made to the uterus by way of fœtus, but this is not so convenient, and could only be in common to it with the whole lower belly. Injection into the vagina has been proposed, but this can seldom be admitted; cases, however, have been alledged of its success. The injection of the smoke of tobacco has been proposed, and I make no doubt of the exertion of its stimulus: Such medicines also as aloes and the fœtid gums (of which, though difficult to explain, the virtue in some measure seems to be proved, of a specific power of encreasing hæmorrhagy,) may be employed. 3. There is another way still of using Stimulants, *viz.* by determining the blood in greater quantity

to

to the descending aorta and its branches, and so to the uterus. Such is the application of warm water to the extremities, and opening the veins of the foot, which last is an evacuation certainly of little consequence in encreasing the impetus indirectly, and is not sensible on a calculation. Purging is a more effectual derivation, as the stimulus subsists some time, as the evacuation that way may be greater than any other, and as the stimulus even may be communicated from the consent between the womb and alimentary canal: Hence acrid purgatives are often effectual Menagogues. The same thing is effected by such medicines as have a particular power of stimulating the urinary passages, as Cantharides, which excite the venereal appetite, which cannot be done without a considerable determination of the blood to the genital parts, and to the uterus in particular. On this account I doubt not but that such, if they could be safely employed, would prove menagogue.

3. Antispasmodics may be menagogue, as the disease is founded in spasmodic constriction. Those of the fœtid kind are supposed to be peculiarly appropriated, but the others would answer equally well, if we had the proper method of applying them, which, as there is a continued spasm, we should suppose might be done at all times; but, on repeated experience, I have found they are only useful in the time of the menstrual period.

None of the medicines proper for the removal of the menstrual obstruction can be employed at all times, and when the period is not established, except the Astringents and Mercury; but it is only at the return of the menstrual period, where there is an aggravation of the symptoms, and an effort of nature, that the Stimulants, and more especially the Antispasmodics, can be effectual. I have no doubt that Musk may be a powerful remedy, when given at the time of the paroxysm, or aggravation. Castor is set down as a general title for the fœtid Antispasmodics. Crocus is very seldom to be depended upon.

CATALOGUS

MATERIÆ MEDICÆ.

MEDICAMENTA agunt in

I. NUTRIENTIA.

Solida	Simplicia	NUTRIENTIA	I.
		ADSTRINGENTIA	II.
		EMOLLIENTIA	III.
Viva		STIMULANTIA	IV.
		SEDATIVA	V.
		ANTISPASMODICA	VI.
Fluida	Alterantia	ATTENUANTIA	VII.
		INSPISSANTIA	VIII.
		DEMULCENTIA	IX.
		ANTACIDA	X.
		ANTALKALINA	XI.
		ANTISEPTICA	XII.
	Evacuantia	ERRHINA	XIII.
		SIALAGOGA	XIV.
		EXPECTORANTIA	XV.
		EMETICA	XVI.
		CATHARTICA	XVII.
		DIURETICA	XVIII.
		DIAPHORETICA	XIX.
		MENAGOGA	XX.

1. Ex VEGETABILIBUS.

a. *Fructus acido-dulces.*

Drupaceæ.

Cerasa.

Mala Armeniaca.

Mala Persica.

Pruna.

Pomaceæ.

Mala Hortensia.

Pyræ.

Hesperideæ.

Aurantia.

Senticosæ.

Fraga.

Rubi Idæi fructus.

Uvæ Vitis.

Ribesia.

Uvæ crispæ.

Fructus succatæ.

Uvæ passæ.

Dactyli.

Ficus.

b. *Cucurbitaceæ.*

Cucumeres.

Melones.

Pepones.

c. *Herbæ.*

c. *Herbæ—Oleracæ.*

Atriplex
Beta.
Spinacia.

Lactuca Agnina.

Siliquosæ.

Brassica.

Nasturtium.

Semiflosculosæ.

Cichorium.

Dens Leonis.

Endivia.

Lactuca.

Umbellatæ.

Celeri.

Asparagus.

Capitatæ.

Cinara.

d.

Fungi.

e.

Radices.

Raphanus.

Rapum.

Umbellatæ.

Daucus.

Pastinaca.

Sisarum.

Semiflosculosæ.

Scorzonera.

Tragopogon.

Battatas.

Alliaceæ.

Porrum.

Cepa.

Allium.

f.

Semina.

Avena.

Hordeum.

Secale.

Milium.

Triticum.

Oryza.

Mayz.

Fagopyrum.

Medulla farinosa.

Sago.

Radix farinosa.

Salpi.

Legumina.

Pisa.

Fabæ.

Phaseoli.

Nuces oleosæ.

Amygdalæ dulces.

Avellana.

Cacao.

Castanea.

Juglans.

Pistacia.

g. *Sepiariæ.*

Olivæ.

h. *Fermentati potus.*

Cerevisia.

Vinum.

i. *Condimenta & condita.*

Aromata.

Saccharo, Sale, vel Aceto condita.

2. EX ANIMALIBUS.

a. Lac Fœminæ.

Asinæ.

Equæ.

Vaccæ.

Ovis.

Capræ.

b. *Quadrupeda.*

Bos.

Ovis.

Caper.

Cervus.

Glîres.

Lepus.

Bestiæ.

Sus.

c. *Aves—Gallinæ.*

Gallus Gallinaceus.

Meleagris Gallopavo.

Pavo Cristatus.

Tetrao Perdix.

Coturnix.

Lagopus.

Tetrix.

Urogallus.

Anseres.

Anas domestica.

moschata.

Boschus major.

Querquedula.

Anser

Anser domesticus.
 ferus.
 Cygnus.
 Pelecanus Bassanus.
 Alca torda.
Gralle.
 Ardea.
 Scolopax.
 Tringa.
 Charadrius.
 Hæmatopus.
 Fulica.
 Rallus.
 Otis.
Passeres.
 Columba.
 Alauda.
 Turdus.
 Emberiza.
 d. *Pisces.*
 Salmo Salar.
 trutta.
 hucho.
 alpinus.
 eperlanus.
 thymallus.
 Cyprinus barbus.
 carpio.
 gobio.
 tinca.
 cæphalus.
 rutilus.
 alburnus.
 brama.
 Perca fluviatilis.
 Gadus æglefinus.
 merlangus.
 morhua.
 molva.
 virens.
 callarias.
 Cyclopterus lumpus.
 Scomber scombrus.
 thynnus.
 Trigla cuculus.
 Mugil.
 Esox lucius.
 Clupea harengus.
 sprattus.
 encrasicolus.
 alosa.
 Pleuronectus flesus.

Pleuronectus solea.
 plateffa.
 maximus.
 hippoglossus.
 Ammodytes.
 Muræna anguilla.
 conger.
 Anarrhichas.
Amphibia nantia.
 Petromyzon.
 Raia batis.
 Accipenser Sturio.
 e. *Insecta.*
 Cancer pagurus.
 gammarus.
 squilla.
 f. *Vermes.*
 Sepia loligo.
Testacea.
 Patella vulgata.
 Helix pomatia.
 Buccinum undatum.
 Turbo littoreus.
 Solen Siliqua.
 Cardium edule.
 echinatum.
 Venus Chione.
 Ostrea maxima.
 edulis.
 Mytilus edulis.
 Volucrum Ova.

II. ADSTRINGENTIA.

I. EX FOSSILIBUS.

Terræ.
 Bolus.
 Cimolia.
 Osteocolia.
Aluminoſa.
 Alumen.
 Lapis Hibernicus.
Metallica, ex Cupro.
 Cuprum.
 Ærugo.
 Vitriolum cæruleum.
Ex Ferro.
 Ferrum.
 Hæmatites.

Rubrica.

Rubrica fabrilis.
 Vitriolum viride.
Ex Plumbo.
 Plumbum.
 Cerussa.
 Lithargyrus.
 Minium.
Ex Zinco.
 Zincum.
 Calaminaris Lapis.
 Tutia.
 Vitriolum Album.

2. EX VEGETABILIBUS.

- a. *Senticosæ.*
 Agrimonia.
 Alchimilla.
 Argentina.
 Caryophyllata.
 Fragaria.
 Quinquefolium.
 Rosa.
 Tormentilla.
- b. *Stellatæ.*
 Aparine.
 Gallium.
 Rubia.
- c. *Vaginales.*
 Acetosa.
 Hydrolapathum.
 Oxylapathum.
 Bistorta.
 Rheum.
- d. *Filices.*
 Filix florida.
 Lingua cervina.
 Trichomanes.
Musci.
 Muscus.
- e. *Acerba.*
 Cydonea mala.
 Mespila.
 Mora.
 Pruna Sylvestria.
 Sorba.
- f. *Varia.*
 Anchusa.
 Balauftia.
 Brunella.
 Hypericum.
 Lythrum.

Millefolium.
 Myrtus.
 Plantago.
 Polygonatum.
 Sanicula.
 Sedum.
 Viscus Quernus.
 Urtica.
 Uva Urſi.
Succi inſpiſſati.
 Acacia.
 Catechu.
 Hypocistis.
 Sanguis Draconis.
Cortices.
 Cortex Granatorum.
 Fraxini.
 Quercus.
 Simaroubæ.
 Lignum Campechense.
 Gallæ.

- 3. *Acida* I. 1. 2. XI. 1. 2.
Vina Auſtera.
Amara IV. i.
Sedativa.
Balfamica IV. f.

III. EMOLLIENTIA.

- 1. Aqua et aquosa blanda.
- 2. EX VEGETABILIBUS.
 - a. *Columniferæ.*
 Althæa.
 Malva.
 - b. *Farinosa et Mucilaginosa.*
 Sem. Cannabis.
 Cydoniorum.
 Fœnugræci.
 Lini.
 Psyllii.
 - c. *Oleracæ.*
 Atriplex.
 Beta.
 Bonus Henricus.
 Spinacia.

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d. *Varia.*

d. *Veriæ.*

Asine.
 Branca ursina.
 Melilotus.
 Parietaria.
 Saponaria.
 Verbascum.
 Rad. Liliorum alborum.
 Cephæ coctæ.

e. *Oleosa.*

Olea pressa blanda.

3. Ex ANIMALIBUS.

Lac.
 Butyrum.
 Adeps.
 Axungia.
 Sperma Ceti dictum.

IV. STIMULANTIA.

1. Ex VEGETABILIBUS.

a. *Verticillatæ. Cephalicæ.*

Betonica.
 Lavendula.
 Stæchas Arabica.
 Melissa.
 Calamintha.
 Majorana.
 Marum Vulgare.
 Origanum.
 Dictamnus Creticus.
 Rosmarinus.
Pectoralia.
 Hyssopus.
 Hederæ terrestris.
 Pulegium.
Stomachica.
 Mentha sativa.
 piperitis.
 Nepeta.
Cardiaca.
 Marum Syriacum.
 Satureia.
 Serpyllum.
 Thymus.
Alexipharmica.
 Salvia.
 Chamædrys.
 Scordium.

b. *Umbellatæ.*

Ammi.
 Amomum.
 Anethum.
 Angelica.
 Anisum.
 Carum.
 Coriandrum.
 Cuminum.
 Daucus Creticus.
 Fœniculum.
 Hippocelinum.
 Levisticum.
 Pimpinella Saxifraga.
 Sefeli Massiliense.
 Siler Montanum.

c. *Siliquosæ.*

Alliaria.
 Cochlearia.
 Eruca.
 Erysimum.
 Lepidium.
 Nasturtium.
 Napum.
 Raphanus rusticus.
 Sinapi.
 Thlaspi.

d. *Alliææ.*

Allium.
 Cephæ.
 Porrum.

e. *Coniferæ.*

Abies.
 Pinus.
 Juniperus.

f. *Balsamica.*

Terebinthina.
 Bals. Copaibæ.
 Gileadense.
 Peruvianum.
 Tolutanum.
 Gum. Guaiacum.
 Myrrha.
 Styrax Liquida.

g. *Sudorifica—Ligna.*

Guaiacum.
 Sassafras.
 Santalum.
Radices.

China.
 Contrayerva.
 Sarsaparilla.

b. *Aræ*

h. *Aromatica fragrantiora.*

Cinnamomum.

Cassia lignea.

Macis.

Nux moschata.

Caryophylli.

Pimento.

Minus fragrantia.

Canella alba.

Cort. Winteranus.

Zinziber.

Acriora.

Piper.

Capsicum.

Debiliora.

Cubebæ.

Cardamomum minus.

Grana Paradisi.

Ingratiora.

Galanga.

Zedoaria.

Serpentaria Virg.

Debilissima.

Balsamita.

Costus orientalis.

Ginseng.

Lilium convallium.

Malabathrum.

Nardus Celtica.

Indica.

Cascarilla.

Ligna.

Aspalathus.

Rhodium.

Gummi.

Benzoinum.

Labdanum.

Styrax calamita.

i. *Amara calida.*

Abrotanum fœmina.

mas.

Absinthium Romanum.

vulgare.

Artemisia.

Carduus benedictus.

Carlina.

Chamemælum.

Santonicum.

Tanacetum.

Aurantiorum Cortex.

Aurantia Curaflavenfia.

Limoniorum Cortex.

Centaurium minus.

Gentiana.

China Chinæ.

Acorus verus.

Chamæpitys.

Marrubium album.

Dictamnus albus.

Lupulus.

Trifolium palustre.

k. *Amara frigida.*

Cichorium.

Dens Leonis.

Endivia.

Lactuca.

Fumaria.

l. *Acrida.*

Arum.

Euphorbium.

Imperatoria.

Iris nostras.

Persicaria urens.

Pyrethrum.

Sedum minus acre.

Staphisagria.

m.

Vinum.

n.

Olea essentialia.

3. Ex ANIMALIBUS.

Cantharides.

Millepedæ.

Cochinillæ.

4. *Nutrientia.**Adstringentia.**Sedativa.**Antispasmodica.**Acida* l. r. a. XI. r. 2.*Alkalina* X. b.*Sales neutri.*

V. SEDATIVA.

1. *Strictius dicta.*
2. *Rheodes.*
Papaver.
- b. *Umbellatæ.*
Cicuta.
Cicuta aquatica.
- c. *Luride.*
Belladonna.
Hyoscyamus.
Mandragora.
Nicotiana.
Solanum.
Stramonium.
- d. *Varie.*
Lactuca.
Laurus.
Coffea.
Thea.
Crocus.
Nymphaea.
- e. *Spirituose.*
Vinum.
Alcohol.

2. *Acida* I. 1. 2. XI. 1. 2.
Sales neutri.
Emollientia.
Adstringentia.
Antispasmodica.

VI. ANTISPASMODICA.

1. Ex FOSSILIBUS.

Ambragrisea.
Succinum.
Petroleum.

2. Ex VEGETABILIBUS.

2. *Herbæ fetide.*
Aristolochia.
Artemisia.
Atriplex olida.
Cardiaca.
Cuminum.
Levisticum.

Meum.
Matricaria.
Pulegium.
Ruta.
Sabina.
b. *Gummi fetida.*
Afa fetida.
Ammoniacum.
Galbanum.
Opopanax.
Sagapenum.
Tacamahaca.

- c. Camphora.
- d. *Radices gravescentes.*
Cassumuniar.
Pæonia.
Valeriana sylvestris.
- e. Fuligo ligni.
- f. Olea essentialia.
empyreumatica.
- g. Alcohol.
Liquor Æthereus.

3. Ex ANIMALIBUS.

Moschus.
Zibethum.

Castoreum.

Sales alkalini volatiles.
Olea empyreumatica.
4. *Adstringentia.*
Emollientia.
Demulcentia.
Stimulantia.
Sedativa.

VII. ATTENUANTIA.

Aqua.
Alkalina X. b.
Sales neutri.
Sapones.
Dulcia IX. c.
Nutrientia 1. a. b. c. d.
Emollientia 2. c. d.

VIII. IN.

VIII. INSPISSANTIA.

Acida XI. 2.
 Alcohol.
Nutrientia 1. e. f. 2. b. &c.
Adstringentia.
Demulcentia a. b. d.

IX. DEMULCENTIA.

- a. *Asperifolia*.
 Consolida major.
 Cynoglossum.
 Pulmonaria.
 b. *Farinosa*.
 Sem. Cucurbitæ.
 Citrulli.
 Cucumeris.
 Melonis.
 Papaveris.
 c. *Dulcia*.
 Saccharum.
 Mel.
 Uvæ passæ.
 Dactyli.
 Ficus.
 Cynosbatus.
 Glycyrrhiza.
 d. *Mucilaginosæ*.
 Gum. Arabicum.
 Ceraforum.
 Senega.
 Tragacantha.
 Amylum.
 Ichthyocolia.
 e. *Nutrientia*.
Emollientia.
Sedativa.

X. ANTACIDA.

- a. *Fossilia*.
 Calcarius lapis.
 Creta.

Osteocolla.
Animalia plerumque testacea.
 Cancrorum chelæ.
 oculi dicti.
 Cervi Cornu ustum.
 Corallina.
 Corallium rubrum.
 Lapis Bezoar orientalis.
 Margaritæ.
 Ovorum testæ.
 Ostreorum testæ.
 Sepiæ os.
 b. *Sales alkalini*.
 Alkali fixum vegetabile.
 fossile.
 Calx viva.
 Alkali volatile.
 c. *Neutra*.
 Borax.
 Tartarus solubilis.
 Sapo.
 d. *Stimulantia*.
Sedativa.
Antispasmodica.
Demulcentia.

XI. ANTALKALINA.

1. *Acida nativa*.
 Acetosa.
 Acetosella.
 Berberis.
 Ribesia.
 Tamarindi.
 Succus Aurantiorum.
 Limoniorum.
 2. *Acida arte parata*.
 Vinum.
 Acidum vegetabile.
 muriaticum.
 nitrosum.
 vitriolicum.
 Sal Sedativum.
 Succini.
 3. *Nutrientia* a. b. c. d. e. g.
Adstringentia 2. c.
Demulcentia.

XII. ANTI-

XII. ANTISEPTICA.

Acida I. a. II. c. XI. 1. 2.
 Alkalina X. b.
 Sales neutri.
 metallici.
 terrestres.
 Olea essentialia.
 empyreumatica.
 Vinum.
 Alcohol.
Nutrientia 1.
Adstringentia.
Stimulantia.
Sedativa.
Antispasmodica.

XIII. ERRHINA.

Mitiora.
 Beta.
 Betonica.
 Majorana.
Acriora.
 Asarum.
 Euphorbium.
 Helleborus albus.
 Iris nostras.
 Nicotiana.
 Ptarmica.
 Pyrethrum.
Fœffilia.
 Turbith minerale.

XIV. SIALAGOGA.

Stimulantia externa.
 Angelica.
 Caryophylli.
 Imperatoria.
 Nicotiana.
 Piper.
 Pyrethrum.
Stimulantia interna.
 Hydrargyrus.

XV. EXPECTORANTIA.

Hedera terrestris.
 Hyssopus.
 Marrubium.
 Pulegium.
 Enula campana.
 Iris Florentina.
 Nicotiana.
 Scilla.
 Petasites.
 Tussilago.
 Benzoinum.
 Styrax calamita.
 Pix liquida.
 Sapo.
Stimulantia b. c. d. f.
Antispasmodica 2. b.
Demulcentia c.

XVI. EMETICA.

1. Ex FOSSILIBUS.

Cuprum.
 Hydrargyrus.
 Antimonium.
 Zincum.

2. Ex VEGETABILIBUS.

Asarum.
 Erigerum.
 Ipecacuanha.
 Nicotiana.
 Scilla.
 Sinapi.
 Raphanus rusticus.
Amara IV. i.
Cathartica.

XVII. CA-

XVII. CATHARTICA.

Acescentia.
 Fructus acido-dulces I. r. a.
 Pruna Brignolensia.
 Gallica.
 Cassia fistularis.
 Tamarindi.
 Dulcia.
 Saccharum.
 Mel.
 Manna.

 Aqua.
 Serum Lactis.
 Lac ebutyratum.

 Olera blanda I. r. c. d.

 Olea blanda ex Vegetabilibus et Animalibus.
 Sapo albus Hispanus.
 Rosæ Damascenæ.
 Viola.
 Polypodium.
 Sinapi.

 Sulphur.

Amara IV. i. k. VI. r. a.
 Bilis Animalium.
Balsamica IV. f.
 Salina.
 Tartarus.
 Alkalina fixa.
 Sales neutri.
 Magnesia alba.
 Acriora.
Antispasmodica 2. b.
 Aloe.
 Agaricus.
 Rhabarbarum.
 Seneka.
 Genista.
 Senna.
 Helleborus niger.
 Mechoacanna.
 Turpethum.
 Jalapium.
 Scammonium.
 Soldanella.

Arthanita.
 Ebulus.
 Sambucus.
 Rhamni baccæ.
 Frangulæ cortex.
 Linum Catharticum.
 Chelidonium majus.
 Gambogia.
 Mercurialis.
 Ricinus.
 Gratiola.
 Nicotiana.
 Helleborus albus.
 Colocynthis.
 Cucumis asininus.
 Elaterium.
 Metallica.
 Aurum.
 Argentum.
 Hydrargyrus.
 Antimonium.

Emetica.

XVIII. DIURETICA.

a. *Umbellatæ.*
 Apium.
 Petroselinum.
 Chærefolium.
 Daucus Sylvestris.
 Fœniculum.
 Meum.
 Pimpinella Saxifraga.
 Siler montanum.
 Eryngium.
 b. *Stellatæ.*
 Aparine.
 Asperula.
 Rubia.
 c. *Variæ.*
 Alkekengi.
 Arnica.
 Arum.
 Asarum.
 Asparagus.
 Absinthium.
 Carduus benedictus.
 Bardana.
 Dulcamara.
 Enula.

Genista.

Genista.
Gramen.
Linaria.
Lithospermum.
Ononis.
Pareira brava.
Perficaria ur. ns.
Ruta.
Sabina.
Saxifraga alta.
Seneka.
Scilla.

d.

Acida I. 1. 2. XI. 1. 2.
Alkalina X. b.
Sales neutri.
Antacida 2.
Sal Ammoniacum fixum.
Sapo.
Olera I. 1. c. e.
Emollientia 1. 2. c. d.
Stimulantia 1. b. c. d. e. f. k. 2.

Guaicum.
Saffuras.
Sarsaparilla.
Seneka.
Salvia.
Scordium.
Metallica.
Antimonium.
Hydrargyrus.

Aqua.
Vinum.
Acida vegetabilia.
Alkali volatile.
Sales neutri.
Olea Essentialia.
Empyreumatica.
Stimulantia.
Sedativa.
Antispasmodica.
Antacida 2.
Emetica.
Cathartica.
Diuretica.

XIX. DIAPHORETICA.

Vegetabilia.
Angelica.
Calendula.
Crocus.
Dulcamara.
Opium.
Ambragrisca.
Moschus.
Zibethum.
Camphora.
China.
Contrayerva.
Serpentaria Virg.

XX. MENAGOGA.

Aloe.
Castoreum.
Crocus.
Ferrum.
Hydrargyrus.
Stimulantia.
Antispasmodica. 1. 2. a. b.
Emetica.
Cathartica.
Diuretica.

Some substances mentioned in the Catalogue are not to be found in the Index, as not being particularly treated of; but their qualities will be understood by looking in the Index for the general title, class, or order under which each substance stands arranged in the Catalogue. Thus the *Alchimilla* is not mentioned particularly in the Index, but its general qualities will be understood by those of the *Senticosæ*, which is to be found in the Index, and is the order to which it belongs.

I N D E X.

A.			Aliment, choice of,	46
			—, proper, what,	47
A	Brotanum foemina,	284	—, mixture of, in the stomach,	52
	Abſinthium vulgare,	ib.	—, vegetable, diviſion of,	53
	Abſorbentia,	39	—, vegetable and animal, com-	
Abſtergentia,	40	pariſon of,	149	
Acacia,	216	—, effects on the mind,	ib.	
Acerba,	204	Alkali, foſſile, as attenuant,	410	
Acerbity in fruits, effects of,	54	—, vegetable, as attenuant,	ib.	
Acid of wine,	311	—, volatile,	384	
Acids in general,	430	—, as antacid,	426	
— particular,	435	—, as attenuant,	410	
— muriatic,	ib.	Alkalina,	ib.	
— vitriolic,	ib.	Alkalines fixed, as antacid,	426	
— vegetable,	ib.	—, as ſtimulants,	323	
— nitrous,	436	Alliacea,	261	
— employed in medicine, liſt of,	437	Allium,	262	
— as Aſtringents,	219	Almonds,	84	
— as Sedatives,	360	Aloes,	481	
— as Stimulants,	322	Alſine,	230	
Acid taſte of plants,	164	Alterants, what,	33	
Acidity in fruits, effects of,	55	Althæa,	227	
Acorus verus,	302	Alum,	182	
Acria as Stimulants,	307	Amara calida,	278	
Acrid taſte of plants,	165	— calida, pharmaceutical treat-		
Acrimony, kinds of,	34	ment of,	344	
Adſtringentia,	169	— frigida,	305	
—, operation of,	170	Ambragriſea,	362	
—, diſeaſes in which they		Amphibia,	138	
are indicated,	173	Amylum,	419	
—, diſeaſes in which they		Analeptica,	35	
are contraindicated,	175	Analysis ſtrictly chemical, of little uſe,	2	
—, means of diſcovering them,	177	Anchuſa,	205	
Æther,	376	Angelica,	254	
Age, old, deſcription of,	17	Animals, what kind moſt proper for		
Agglutinantia,	41	food,	121	
Agrimonia,	198	—, diviſion of,	125	
Alcohol,	359	Aniſum,	255	
Aliment, difference of,	45, 150	Anodyna,	37	
—, vegetable,	45	Anſeres,	133	
		T t t	Antacida,	

Antacida, synonyms to,	-	39	B.		
———, —	-	420	Balaustines,	-	206
Antacria, —	-	38	Balsam Copaibæ,	-	
Antalkalina, —	-	39, 430	——— Gilead,	-	
Antiphrodisiacs, —	-	43	——— Gum Guaiac.	-	263
Anthelmintica, —	-	44	——— Peruv.	-	
Antimony, —	-	467	——— Tolut.	-	
Antiphlogistica, —	-	37	Balsamics as astringents,	-	221
Antiseptica, —	-	39, 437	——— as cathartic,	-	482
Antispasmodica, as expectorant,	-	459	Barley,	-	74
———, synonyms to,	-	37	Beans. <i>Vide</i> Legumina.	-	
Antispasmodics, definition of,	-	33	Beef, qualities of,	-	126
———, fossile,	-	362	Beet, qualities of,	-	63
———, vegetable,	-	364	Belladonna,	-	353
———, as Sedatives,	-	360	Benzoin,	-	458
———, as Stimulants,	-	322	Benzoinum,	-	276
Aperientia, —	-	39	Betonica,	-	249
Aphorisms, Linnaeus's, commented	-	158	Bile, as a cathartic,	-	478
on, —	-	43	Bittern,	-	137
Aphrodisiacs, —	-	57	Bitters as astringents,	-	221
Apples, qualities of,	-	56	Bitter taste of plants,	-	164
Apricot, —	-	198	Bivalves,	-	147
Argentina, —	-	365	Blood, denser in proportion to the	-	
Aristolochia, —	-	90	rigidity of the vessels and	-	
Aromata, —	-	<i>ib.</i>	age of the subject,	-	11
———, where proper,	-	272	———, human, account of,	-	388
Aromatica fragrantiora,	-	307	———, of animals, as food, effects of,	-	120
Arum, —	-	367	Blood vessels, effects of custom upon,	-	32
Asia foetida, —	-	276	Boerhaave, his plan of a Materia	-	
Aspalathus, —	-	66	Medica the best,	-	2
Asparagus, —	-	418	Boles,	-	180
Asperifolia, —	-	48	Borax,	-	429
Affimilation of nutriment,	-	178	Branca Ursina,	-	230
Astringency, in what parts of vege-	-	35	Brassica, qualities of,	-	74
tables it is lodged,	-	179	Bread, its use universal,	-	76
Astringentia, synonyms to,	-	186	———, propriety of its use,	-	<i>ib.</i>
Astringents, fossile,	-	194	———, different kinds of it,	-	77
———, metallic,	-	195	———, when best prepared,	-	78
———, vegetable,	-	199	———, use of baking it,	-	<i>ib.</i>
———, why proper to	-	360	Brunella,	-	206
be given in substance,	-	322	Buckwheat,	-	76
———, dose of,	-	405	Bustard,	-	135
——— as Sedatives,	-	38	Butter,	-	86
——— as Stimulants,	-	34	Butter-milk,	-	116
Attenuantia, —	-	36	C.		
———, synonyms to,	-	230	Cacao nut,	-	84
———, what,	-	365	Calamintha,	-	250
Attrahentia, —	-	286	Calefacientia,	-	36
Atriplex —	-	<i>ib.</i>	Camphire,	-	368
——— olida,	-	164	Canella alba,	-	273
Aurantia curassavensis,	-		Cannabis semen,	-	228
Aurantiorum cortex,	-		Cantharides,	-	318
Austere taste of plants,	-		Capficum,	-	273
			Cardiacs,		

Cardiacs,	-	42	Crocus,	-	359
Carduus benedictus,	-	284	Cucumber, qualities of,	-	61
Carlina,	-	285	Cucumis asininus,	-	484
Carminativa,	-	37	Curlew,	-	136
Carrot,	-	69	Currants, qualities of,	-	58
Caryophyllata,	-	188	Custom, effects of,	-	21
Cascarilla,	-	276	Cyclopterus lumpus,	-	144
Castumuniar,	-	382	Cydoniorum semen,	-	228
Castor,	-	381	Cynoglossum,	-	418
Catechu,	-	216	Cyprinus,	-	144
Cathartica,	-	35, 474	D.		
Celeri,	-	65	Dandelion,	-	65
Centaurium minus,	-	287	Date, qualities of,	-	60
Cepa,	-	262	Daucus creticus,	-	254
— cocta,	-	231	— sylvestris,	-	255
Cephalica,	-	41	Demulcentia,	-	416
—, verticillat.	-	249	—, as expectorant,	-	469
Chamædrys,	-	253	—, synonyms to,	-	38
Chamæmelum,	-	285	Dens Leonis,	-	65
Chamæpitys,	-	302	Deobstruentia,	-	39
Cherries,	-	56	Deoppilantia,	-	40
Chesnut,	-	83	Depurantia,	-	ib.
Chicken,	-	130	Detergentia,	-	ib.
China Chinæ,	-	287	Diaphoretica,	-	35, 489
— rad.	-	270	Dictamnus albus,	-	303
Cichoreum,	-	65	— Creticus,	-	254
Cicuta,	-	351	Digestiva,	-	40
— aquatica,	-	353	Diluentia,	-	38
Cimolia,	-	181	Discutientia,	-	40
Cinara,	-	65	Diuretica,	-	35, 486
Clupea,	-	145	Drink, effect on the aliment,	-	87
Coccinella,	-	321	— blood vessels,	-	ib.
Coffea,	-	357	— lymph,	-	ib.
Colocynthis,	-	484	Drupaceous fruits, qualities of,	-	54
Colour of medicines, not to be relied			Duck, tame,	-	133
on, for a knowledge of their			—, Muscovy,	-	134
qualities,	-	2	Dulcamara,	-	489
— of the blood different, cause			Dulcia, as Attenuants,	-	413
of,	-	11	—, as Demulcents,	-	419
— of plants,	-	166	E.		
Columniferæ,	-	227	Earths, simple, astringent,	-	179
Condientia,	-	39	—, saline, astringent,	-	182
Condimenta,	-	90	—, absorbent,	-	424
Coniferæ,	-	227, 263	Eel kind of fish,	-	145
Consolida major,	-	418	Eggs of birds,	-	148
Consolidantia,	-	41	Elaterium,	-	484
Contrayerva,	-	271	Emetica,	-	35, 460
Coot,	-	137	Emollient substances, parts of in		
Copper, virtues of,	-	186	which their virtues reside,	-	225
—, dose of,	-	188	Emollientia ex animalibus,	-	232
Coriandrum,	-	254	—, synonyms to,	-	36
Corn. cerv. ustum,	-	424	—,	-	222
Cotula foetida,	-	285	T t t 2		
Creta,	-	424	Emollients,		

Emollients, indications of,	224	Food, animal and vegetable, compared,	101
——, sensible qualities which		——, ——, effects of, <i>ib.</i>	
——, discover them, -	226	——, ——, in what	
——, Pharmaceutical treat-		proportion they ought	
ment, -	<i>ib.</i>	to be mixed, <i>ib.</i>	
——, particular, -	<i>ib.</i>	Food, variety, effects of, -	105
——, as Sedatives,	360	——, vegetable, bad effects of,	86
——, as Attenuants,	<i>ib.</i>	Fragaria, -	198
Endive, -	65	Fraxini cortex, -	217
Endivia, -	<i>ib.</i>	Frog, -	139
Enula campana, -	456	Fructus acido dulces, -	54
Epispastica, -	36	——, as Cathartics, -	477
Erodentia, -	44	Fruits, when most proper to be used,	59
Errhina, -	34, 439	——, dry, -	<i>ib.</i>
——, synonyms to, -	39	Fuligo, -	385
Eruca, -	259	Fumaria, -	306
Erysimum, -	<i>ib.</i>	Fungi in general, -	89
Essentia Limonum, -	286		
Evacuants, what, -	34		
——, in general, -	438	G.	
Euphorbium, -	307	Gadus, -	144
Expectorantia, -	35, 455	Galanga, -	274
Exsiccantia, -	35	Gallæ, -	218
Exsiccants, as confounded with		Garlic, -	70
Astringents, -	221	Genista, -	483
		Gentiana, -	287
		Ginseng, -	276
F		Globules red, of the blood, -	390
Farinacea, as Demulcents,	418	Goat, flesh of, -	127
Farinosa, -	227	Gold, -	484
Fibres, moving, affected by custom,	25	Goosberries, qualities of, -	58
Fig, qualities of, -	60	Goose, Solan, -	135
Filices, -	202	——, tame, -	134
Fishes, -	140	Grallæ, -	135
——, used in food, list of,	<i>ib.</i>	Grapes, fresh, qualities of, -	58
——, of their qualities in general,	142	——, dry, qualities of, -	63
Flounder kind of fish, -	145	Grouse, -	132
Fluids, state of, -	11	Guaiacum, -	269
——, distribution of, -	12	Guana, -	139
——, scarce alterable by medicines,	20	Gummata foetida, -	366
——, animal, nature of, -	387	Gums, simple, -	419
Foeniculum, -	254	Gurnard, -	144
Foenugræci semen, -	228		
Food, animal, -	95	H.	
——, ——, alkalescency of,	121	Habit, what, -	22
——, ——, ——, how	<i>ib.</i>	Hæmatites, -	192
determined, -		Hair, colour, form, and quantity, a	
——, ——, as to quantity of nu-		mark of the state of the solids,	10
triment, -	123	Hare, -	128
——, ——, as to the nature of		Heat, effect of, on fruits, -	59
the fluids they afford, -	124	Hedera terrestris, -	251
——, ——, perspirability of, 123,	124	Hellebor. niger, -	484
——, ——, solubility of, <i>ib.</i>		Hen, -	130
——, ——, strictly so called,	117	Hepatics, -	43
		Herbæ	

Herbæ foetidæ, - - -	364	Legumina, qualities of, -	81
Heron, - - -	137	Lenientia, - - -	38
Hesperidæ fructus, - -	57	Lettuce, - - -	65
History, Natural, application of to the Materia Medica, -	151	----- lamb. <i>Vide</i> Lactuca agnina.	
Hog, - - -	128	Levisticum, - - -	254
Humectantia, - - -	36	Levity, what, - - -	14
Hypericum, - - -	206	Lignum Campechense, -	218
Hypnotica, - - -	37	Lilior. albor. rad. -	231
Hypocystis, - - -	216	Lilium convallium, - -	275
Hyoscyamus, - - -	354	Limoniorum cortex, -	286
Hyslopus, - - -	250	Lini semen, - - -	229
I.		Linnaeus, his System of Natural Hi- story recommended, -	151
Jalapium, - - -	484	Liquors, fermented, effects of, -	88
Ichthyocolla, - - -	419	-----, -----, on what their varieties depend, -	89
Idiosyncrasy, what, - -	9, 20	Lupulus, - - -	303
-----, effects of, -	53	Luridæ, - - -	353
-----, effects on the fluids, -	21	Lymph, coagulable, of the blood, -	388
-----, hereditary, -	ib.	Lythrum, - - -	207
Immutantia, - - -	39	M.	
Imperatoria, - - -	307	Magnesia alba, - - -	424
Incidentia, - - -	38	-----, as cathartic, -	478
Incrassantia, - - -	ib.	Majorana, - - -	250
Indication, what, - -	31	Maiz, - - -	75
Indications in Chirurgery, -	40	Malt liquors, - - -	318
Indurantia, - - -	36	Malva, - - -	227
Infancy, description of, -	15	Manhood, account of, -	16
Insecta, - - -	145	Marrubium album, - -	303
Insipid taste in plants, -	165	Marum Syriac. - - -	252
Inspissantia, - - -	34, 414	----- vulg. - - -	250
-----, synonyms to, -	38	Materia Medica, knowledge of, what, -	1
Iris Florentina, - - -	457	Maturantia, - - -	40
— nostras, - - -	307	Mechoacanna, - - -	484
Iron, - - -	183	Medicines, general division of, -	32
-----, dose of, - - -	191	-----, virtues of, -	151
-----, virtues of, - - -	190	Melilotus, - - -	230
Irritability increased by repetition of the impression, - - -	23	Melissa, - - -	250
L.		Melon, qualities of, -	60
Labdanum, - - -	277	Menagoga, - - -	35, 491
Lactuca agnina, - - -	65	Mentha sativa, - - -	252
-----, as sedative, -	356	----- piperit. - - -	251
Lactescency of plants, -	160	Mercury, - - -	442
Lamb, qualities of, - -	126, 127	Millefolium, - - -	208
Lamprey, - - -	140	Millepedes, - - -	321
Lapis Hibernicus. <i>Vide</i> Slate.		Milk, - - -	106
Lapwing, - - -	136	-----, its nature, and general qua- lities, - - -	107
Lavendula, - - -	240	-----, to whom best suited, -	108
Laurus, - - -	356	-----, various kinds of, -	111
Laxantia, - - -	38	-----, rules for its cookery, -	113
Lead, - - -	192	-----, examination of its parts, -	114
Leek, - - -	70	Millet, - - -	74
		Morelle, -	

Morelle, - - -	68	Paste, kinds of, - - -	80
Mullet, - - -	144	Peach, qualities of, - - -	56
Mundincaia, - - -	40	Peacock, - - -	131
Muscus, - - -	204	Pears, qualities of, - - -	57
Mushrooms, - - -	67	Pease. <i>Vide</i> Legumina.	
Musk, - - -	380	Pecora, what kinds used,	125
Must of wine, - - -	309	Pectoralia, verticill. - - -	250
Mustard, as emetic and cathartic,	258	Pectorals, - - -	42
——, as a cathartic, - - -	478	Perficaria urens, - - -	308
Mutton, qualities of,	126	Peruvianus cortex. <i>Vide</i> China Chinæ.	
Myrrh, - - -	268	Petasites, - - -	458
Myrtus, - - -	208	Petroleum, - - -	363
N.			
Nasturtium, qualities of,	63	Pheasant, - - -	131
Nephritics, - - -	43	Pigeon, - - -	137
Nerves, the extent of their power in the system, - - -	6	Pike, - - -	145
Nicotiana, - - -	355	Pimpinella - - -	254
——, as expectorant,	456	Piper, - - -	273
Nuces oleosæ, - - -	82	Pistachio nut, - - -	84
Nut, hazel, - - -	83	Pix liquida, - - -	459
Nutrientia, - - -	45	Plan of the work, - - -	1
——, as Attendants, - - -	413	Plantago, - - -	209
——, as Stimulants, - - -	321	Plover, green, - - -	137
——, definition of, - - -	33	Plumbs, qualities of, - - -	56
——, synonyms to, - - -	35	Pneumonics, - - -	42
Nutritious substances, difference of,	47	Polygonatum, - - -	209
Nymphæa, - - -	359	Polypodium, - - -	483
O.			
Oats, - - -	74	Pomaceous fruits, qualities of,	57
Odour of plants, what a mark of,	161	Pompion, qualities of, - - -	60
Oil, effects of, - - -	85	Pork, - - -	121
——, nutritive, - - -	85	Porrum, - - -	262
Oils, empyreumatic, - - -	375	Potatoc, - - -	71
——, essential, - - -	377	Power, nervous, different state of,	13
——, expressed, as cathartic,	477	——, ——, effects of custom upon,	28
Olives, - - -	85	——, ——, medicines to be chiefly directed to, - - -	20
Olea pressa blanda, as emollient,	231	Pruna sylvestria, - - -	205
Oleraceæ, as emollients,	229	Psyllii semen, - - -	229
Onion, - - -	70	Ptarmica, - - -	39
Ophthalmica, - - -	42	Puddings, kinds of, - - -	80
Opium, - - -	331	Pulegium, - - -	250
Orache, - - -	63	Pulmonaria, - - -	418
Oranges, China, qualities of,	57	Pulmonics, - - -	42
Osteocolla, - - -	181, 424	Pyrethrum, - - -	308
Oyster, common, - - -	147	Q.	
P.			
Pæonia, - - -	382	Quail, - - -	131
Parietaria, - - -	231	Qualities, chemical, of plants,	167
Parfneq, - - -	69	Quicklime, - - -	411, 426
Partridge, - - -	132	Quinquefolium, - - -	198
Passeres, - - -	137	R.	
		Rabbit, - - -	128
		Radish, - - -	69
		Rail, - - -	136
		Raphanus	

Raphanus rusticanus,	257	Seeds, farinaceous,	73
Raspberries, qualities of,	57	Seneka,	483
Refrigerantia,	37	Senna,	484
Repellentia,	40	Sense, organs of affected by custom,	23
Repercutientia,	40	Sensibility, diminished by repetition,	23
Reprimentia,	40	Senticosæ, qualities of,	57, 197
Reptiles,	138	Serosity of the blood,	391
Resolventia,	38	Serpentaria Virginiana,	274
Restaurantia,	35	Serpyllum,	262
Rhabarbarum,	483	Seseli Maffiliense,	254
Rhodium,	276	Sialagoga,	34, 442
Rice,	75	———, synonyms to,	39
Roborantia,	36	Siliquosæ, use of,	90, 256
Roots esculent,	68	Silver,	485
Rosæ Damascenæ,	483	Simaroubæ Cortex,	217
Rosmarinus,	250	Sinapi,	257
Rubefacientia,	36	Sistentia,	36
Rubia,	200	Skirret,	69
Ruta,	365	Slate,	185
Rye,	74	Smell of Medicines, not to be de- pended on for a knowledge of their qualities,	2
S.		Snipe,	136
Sabina,	366	Soap,	429
Sago,	72	———, as expectorant,	459
Salep,	71	———, as cathartic,	477
Salmon kind of fish,	143	Solids, simple, state of,	10
Salt,	91	———, proportion between them and the fluids,	10
Salts, neutral, as Attenuants,	412	———, alterable by manner of life,	20
———, as Antacids,	429	———, effects of custom upon,	22
———, as Cathartics,	477	Solubility of food,	51
———, as Sedatives,	360	———, how diversified,	52
———, as Stimulants,	323	Solution of food in the stomach, how performed,	117
Salvia,	253	———, how varied,	118
Sanguis Draconis,	216	Somnifera,	37
Sanicula,	210	Soporifera,	37
Santalum,	270	Soul, its effect on the body,	4
Santonium,	286	Specifics,	41
Saponaria,	231	———, supposed, list of,	44
Sapones,	412	Spinach,	63
Sarcotica,	40	Splenetics,	43
Sarsaparilla,	270	Stæchas Arabica,	250
Sassafras,	269	Sternutatoria,	39
Satureia,	252	Stellatæ,	199
Scammonium,	484	———, as Diuretics,	488
Scate,	140	Stimulant virtue, foundation in sen- sible qualities,	246
Scilla,	457	———, in what part lodged, <i>ib.</i>	
Scordium,	253	Stimulantia, synonyms to,	36
Scorzonera,	69	———, as expectorant,	459
Sedativa, synonyms to,	37, 323	———, manner of their operation,	233
Sedatives, definition of,	35	Stimulants,	
———, as Astringents,	221		
———, as Stimulants,	322		
———, particular,	331		
Sedum,	210		
——— minus acre,	308		

Stimulants, definition of,	33	Thea,	-	357
——, effects of,	239	Thoracics,	-	42
——, indications of,	240	Thymus,	-	252
——, effects in the blood-		Tobacco. <i>Vide</i> Nicotiana.		
vessels,	<i>ib.</i>	Tormentilla,	-	198
——, on the nervous system,	241	Trifolium palustre,	-	304
——, in the alimentary canal,	242	Turkey,	-	131
——, contra-indications of in		Turnep,	-	69
the sanguiferous system,	243	Turtle,	-	138
——, remarks with regard to		Tussilago,	-	458
their use,	244		U. V.	
——, pharmaceutical treatment		Valeriana sylvestris,	-	382
of,	247	Vaginales,	-	201
——, particular,	248	Veal, qualities of,	-	126
——, animal,	318	Vegetables, become acid in the sto-		
——, as expectorant,	459	mach,		49
Stomach, its sympathy with the rest		Venison,	-	127
of the system,	8	Verbascum,	-	231
Stomachica verticill.	251	Vermes,	-	146
Stomachics,	42	——, list of used in food,	<i>ib.</i>	
Strawberries, qualities of,	57	Verticillatæ,	-	248
Sturgeon,	140	Vesicantia,	-	36
Styrax calamita,	276	Vinegar,	-	92
——, as expectorant,	458	Viper,	-	139
liquida,	268	Viscus Quernus,	-	211
Succi inspissati,	216	Umbella æ,	-	253
Succinum,	362	——, as diuretics,		488
Sugar, nutritive,	47, 93	Urtica,	-	211
Sulphur,	477	Uterines,	-	43
Suppurantia,	40	Uva Ursi,	-	211
Swan,	134	Vulneraria,	-	41
Sweet taste of plants,	164		W.	
Sweetness in vegetables, effects of,	55	Walnut,	-	83
Syngenesia,	284	Water,	-	406
		——, as a cathartic,	-	477
T.		——, as emollient,	-	226
Tanacetum,	286	——, as attenuant,	-	406
Tartar, as cath.	476	Wheat,	-	75
Tartarus solubilis,	428	Wine, as stimulant,	-	309
Taste, of great use in discovering the		——, as sedative,	-	359
qualities of medicines,	2	——, of different countries, re-		
Tastes, arrangement of,	164	marks on,		316
——, simple,	<i>ib.</i>	Wines, austere, as astringents,	-	220
——, compound,	<i>ib.</i>	Winteranus Cortex,	-	273
Teal,	139	Woodcock,	-	136
Temperament, what,	4		Y.	
Temperaments, sanguineous,	18	Youth, description of,	-	16
——, choleric,	19		Z.	
——, melancholic,	<i>ib.</i>	Zedoaria,	-	274
——, phlegmatic,	<i>ib.</i>	Zibethum,	-	381
Tension, effects of on the system,	22	Zinc,	-	194
Terebinthina,	263	Zinziber,	-	273
Terra Japonica. <i>Vide</i> Catechu.				
Texture of vegetables, effects of,	55			

Page 1. line 5. *For* Hence plethora &c. *to the end of the paragraph, read*
Obesity may cause plethora; as in obesity, though a greater
quantity is secreted, it is not let off from the body, and
may therefore press upon the vessels and cause plethora.

l. 17. *For viz. read* besides those of.

l. 22. *For* of these proportions, *read* and proportions of these.

l. 25. *For* as their less or greater florid colour, *read* as the less
or more florid colour of the whole.

P. 12. l. 4. *For* pure principle, *read* to the abundance of a pure wa-
tery part, as saline matter may, &c.

l. 27. *After* arterious coats, *add* in proportion to those of the
veins.

l. 28. *For* people, *read* animals.

P. 13. l. 17. *For the whole of this and the following paragraph, to produ-*
ced, p. 14. l. 3. a line, read

5. *Different state of the nervous power* with regard to sen-
sibility, irritability, mobility, and strength. By sensibility we
mean the fitness for having sensation excited by external
impression; and as different forces of impression are ne-
cessary to move different persons, the sensibility is great-
er, as the less force of impression is necessary to sensation.
By irritability, we mean the fitness for having motions
excited in consequence of sensation, or other causes; and
this appears different, not only with respect to the de-
gree of force in the cause, but with respect to the extent
of the effects in the system. Thus, of two persons, not
only one will be vomited by a much smaller quantity
of an emetic than the other, but also two persons taking
the same dose will be very differently affected, while, in
the one, the effects will be confined to the stomach, and
the parts necessarily connected with it in vomiting, and, in
the other, the effects will be extended so as to produce
convulsions over the whole body. Of the difference of

sensibility we are able to judge but grossly, as it does not always depend on the degree of force in impression, but in this respect is greatly changeable by custom and practice. This is particularly to be observed, that there is a great difference between the sensibility to a single impression, and the sensibility to the difference of force in the same species of impressions, or to the difference of impressions nearly akin to one another. Thus, there may be two persons equally sensible to the smallest impressions of any sapid body on the tongue; but, while the one may be able to distinguish only green from bohea tea in infusion, and hardly any difference in the qualities of each, the other shall be able to distinguish not only many different degrees in the qualities of either species, but also, in the case of their mixture, be able to discern the proportion in which they are mixed together. The same difference of sensibility occurs more frequently still with respect to sound. A person may be exquisitely sensible to the softest impression of sound, but, at the same time, may be very little sensible to any difference of tones. Irritability must commonly be connected with sensibility; for, as motion depends upon sensation, that, therefore, will be generally in proportion to this: But they are not absolutely connected; for, independent of the nervous power in the brain, the subject of sensations, irritability is often varied by the greater or lesser tension, and perhaps other circumstances, of the moving fibres themselves. Both sensibility and irritability are often connected with the weakness of the nervous power, never remarkably with its strength.

Another particular in which the state of the nervous power may be different, is mobility, that is, the facility and readiness with which not only motions are in general

ral excited, but especially that also with which different motions succeed one another. In the first respect, mobility is the same with irritability; but, in the last, it is somewhat different. It is obvious, that the nervous power or sensorium, is more tenacious of impressions in one person than in another; and the change, therefore, from one motion to another, will, in such persons, be in the same proportion; which amounts to this, that there is a difference of mobility in the nervous power of different persons. However, we observe that this mobility is commonly greatest in the most sensible and irritable systems. Lastly, The nervous power, or energy of the brain, differs greatly in point of strength. Some have supposed that the strength of the body depended upon the strength of the simple solids; and I allow that it is often connected with this. But, as the state of the simple solids cannot be suddenly changed, those changes of debility and strength which are sudden and transitory, must be owing to changes in the state of the nervous power. Thus, at the invasion of fevers, we observe a considerable debility take place, more suddenly than we can suppose any change to be made in the state of the simple solids. Again, in maniacal persons, there is often an incredible increase of strength, which we cannot suppose to proceed from an increased rigidity of the simple solids so suddenly produced. This strength, &c.

Page 15. line 21. *After blood add vessels.*

P. 16. l. 13. *For haemoptoifis, read haemoptysis.*

l. ead. *Dele peripneumony.*

l. 27. *After secretion, add of oil.*

P. 20. l. 9. *For E. g. 1. read to this purpose observe, 1. That,*

l. 11. *Dele 2. and what follows, to causes, l. 16.*

l. 19. *For so, read produced.*

l. 22. *Dele and particularly irritability..*

- Page 20. l. 24. *For that, read their.*
- P. 22. l. 22. *For This, read The necessity of a certain degree of tension.*
- P. 23. l. 1. *For Repetition, &c. to accurate, l. 3. read Repetition diminishes sensibility, and if, upon occasion, it seems to increase it, it is only in so far as it renders perception of the different degrees of impression more accurate.*
- l. 21. *For a strong emetic, read frequent emetics.*
- P. 26. l. 3. *For flexion, read extension.*
- P. 27. l. 1. *For this, &c. to steadiness, l. 4. read All this is assisted, not only by the influx into the several muscles becoming more free, but also by frequent repetition, as it is only by such experience that we learn the most proper attitude and concurrence of muscles for performing any action with facility and steadiness.*
- P. 27. l. 7. *Dele Thus, &c. to effect, l. 10.*
- P. 29. l. 15. *For did read does.*
- P. 31. l. ult. *For is the rule, &c. to health, p. 32. l. 2. read is declaring the change to be made in the state of the body necessary for changing a diseased state to that of health.*
- P. 32. l. 22. *For for, read instead of.*
- P. 39. l. ult. *For dissolves, read resolves.*
- P. 49. l. 1. *After food, add instead of.*
- l. 13. *For even it is not free of the vinous, read it even admits of the vinous.*
- P. 51. l. 5. *For nutritious juice, read gastric liquor.*
- l. 3. a fin. *Dele by a weight appended.*
- P. 52. l. 7. *For former read firmer.*
- P. 57. l. 6. *Dele The pear, &c. to digested, l. 10.*
- P. 62. l. 2. *For no, read little.*
- P. 64. l. 5. *For Nasturtium, read Brassica.*
- P. 69. l. 21. *For red beet, read white beet.*
- P. 73. l. 11. *Dele in the East-Indies, to European corn.*
- P. 81. l. 18. *For culture, read manure.*

- Page 84. line 10. *For* which has made it a doubt, *read* but it is a doubt
- P. 96. l. 19. *For* veal *read* chicken
- P. 97. l. 20. *For* both solution, *read* both flow solution
- P. 97. l. 27. *For* to this head, &c. *to* stimulus, l. 29. *read* to this head of difficult mixture; for though the vegetable food may continue long in the stomach, it gives little stimulus to the system.
- P. 98. l. 9. *For* cucumbers, &c. *read* cucumbers, fructus,
l. 11. *For* cause, *read* occasional cause
- P. 101. l. 3. *For* crude, *read* rude
- P. 102. l. 21. *For* that men, *read* that those men
- P. 103. l. 4. *For* sciences, *read* scenes,
- P. 110. l. 17. *For* like animal food it does not, *read* it does not like animal food,
- P. 111. l. 8. & 9. *For* will often be so, *read* as it may often be
- P. 113. l. 9. *For* rules of the cookery, *read* rules for the use
l. 18. *For* milk, &c. *to* exposed to, *read* milk exposed for some time to the air, suffers more or less of
- P. 114. l. 10. *After* therefore, *add* the former
l. 11. *After* vigorous, *add* the latter
l. 18. *For* cured, *read* curd
l. 23. *For* or addition in, *read* in or added to
- P. 115. l. 29. *For* cow's milk, &c. *to* all, l. 31. *read* cows milk allows less of its oil to be separated with the whey; from that of sheep and goats, there is more.
- P. 116. l. 23. Condiments, &c. *to* constitutions, *should be Italics.*
- P. 119. l. 29. *For* roasted is not, *read* boiled is.
- P. 120. l. 16. *For* more, *read* less.
l. 17. *Dele* only
l. 18. *For* also, *read* rather
- P. 129. l. 16. *Dele* upon the whole, *and to the end of the paragraph.*
- P. 135. l. 5. *Dele* not
- P. 138. l. 12. *After* beasts, *add* and birds.
- P. 140. l. 16. *For* Rara, *read* Raia.

Page 140. line 29. *For Canus, read Genus*

P. 149. l. 3. a fin. *For stronger motions, read exercise*

l. 2. a fin. *For vigorous efforts, read activity.*

P. 150. l. 20. *For fishes read birds*

P. 176. l. ult. *For Wine, read Steel*

P. 187. Note l. ult. *After Ruffel, add Diff. de Cupro Edin. 1757.*

P. 191. l. 9. *For in melting antimony with nitre, read by applying nitre to the martial regulus of antimony in fusion.*

l. 23. *For consequence, read causes*

P. 215. Note. *For by the late Dr Millar, read by Dr Cullen himself;*

P. 217. l. 17. *For Bold, read Bowles.*

P. 226. l. 5. *After butter, add rubbed on the outside of the nostrils.*

P. 230. l. pen. *For Borrago, read Ærugo,*

P. 236. l. 13. *For No doubt, &c. to likeways, l. 17. read Many think that emetics are specifically disposed to operate on the fibres of the stomach, and purgatives on those of the intestines; and it is alledged, that, when mixed with the blood, their operation is only upon these parts: But, the experiments adduced in proof of this fact are very fallacious; and it is still probable, that the effects of these medicines, as commonly exhibited, depend entirely on the quantity and solubility of the medicine, and sensibility of the different parts.*

P. 237. l. 4. *For operations, read secretions.*

P. 238. l. 4. *For if not, read and perhaps*

l. 5. *After organ, place a point, and add, If the stimulant externally applied acts only on the nerves of the skin, it will cause*

l. 9. *For This last has, read These effects have*

l. 11. *None of the manuscripts we have seen make any tolerable sense of this paragraph, and it should therefore, perhaps, be left out altogether; but we shall venture to give here what we conceive to be the Doctor's sense of this matter.*

Abstracting from the effects of the increased action of the moving fibres upon the motion of the fluids, we think it proper here to consider more simply the effects of stimulants on the moving fibres themselves. These are, in general, the increasing the influx, or exciting the action of the nervous power in the fibres; and this, according to the different degrees of force in the stimulus, may be in different states; as, 1. An increase of tone only. 2. Involuntary and convulsive action. And, 3. Spasmodic contraction. The tone or constant tendency to contraction which subsists in the moving fibres of living bodies under any degree of extension, is partly owing to the elasticity of the simple solid, but more considerably to the constant energy of the brain, in determining the nervous power into the moving fibres; and it is owing to the various states of this energy of the brain, that we observe such sudden vicissitudes of debility and strength in the moving fibres of the whole body. Hence, stimulants applied to any part, often have their action communicated to the sensorium, and may increase the energy of the brain so much, as to increase the tone of the moving fibres over the whole system. These stimulants, therefore, may be employed as tonics, but seldom with conveniency, as they are apt to increase too much the action of these parts, which are otherways exposed to a constant stimulus. Such is the sanguiferous system; and, as the inflammatory diathesis consists in the increased tone of the heart and arteries, our stimulants are very apt to induce or increase this diathesis. However difficult it may seem to distinguish between the tonic effects of astringent, sedative, and stimulant medicines, it is certain that the stimulants are more remarkable than the others for their inflammatory powers, and are therefore, upon many occasions,

inconvenient. The influx of nervous power capable of giving tone, we suppose to be in a less degree than is necessary to excite contraction, and it is only when the stimulus is stronger, that contractions are produced. In these it is observed, that they are not naturally of long continuance, but are necessarily succeeded by a relaxation; and so far is this a law of the system, that, in many cases, tho' a stimulus is constantly applied, it does not produce a constant contraction, but a number of contractions alternating with relaxations. In this case, the motions are called convulsions. The motions appearing in this shape depend probably on the force of the stimulus, and the degree of contraction produced; for there is a contraction of muscles which does not alternate with relaxation. It is what modern physicians more strictly call a spasm; and, as the contraction is not only more permanent, but appears also to be in a more considerable degree, we think it may be considered as the effect of a stronger stimulus. From the whole, it appears, that the effects of stimulants, as operating on the moving fibres only, are, increasing tone, exciting convulsions, or producing spasm; and that these will arise according to the degree of force in the stimulus and the irritability of the parts taken together.

Page 239. line 13. *For haunch, read knee*

P. 240. l. 14. *For effects in, read indications with respect to*

l. 17. *For inconsiderable, read considerable*

l. 22. *For endued, read induced*

l. 26. *After 3. add Where the languor and inertia are especially in the extreme vessels,*

P. 241. l. 11. *For effects on, read indications with respect to*

P. 242. l. 5. *For effects in, read indications with respect to*

P. 244. l. 5. *For being, read are*

P. 245. l. 13. *For effect, read purpose*

- Page 245. line 28. *For* must be laid aside, *read* these may be neglected;
- P. 247. l. 27. *For* oils, *read* extracts
- l. penult. *For* essential oil with water, *read* water with essential oil,
- P. 255. l. 7. *For* without acrimony or, *read* with little acrimony, and with little
- P. 256. l. 18. *For* As being of the Verticillatae they, *read* As we have said before of the Verticillatae, so the Umbellatae
- P. 258. l. 15. *For* $\xi\iota$, *read* $\xi\iota\varsigma$
- l. 31. *For* as on depending on, *read* by
- P. 259. l. 13. *For* sensible, *read* insensible
- l. 28. *For* trachea, *read* fauces,
- P. 260. l. 11. *For* little, *read* no such
- P. 261. l. 4. a fin. *For* Alliaciae, *read* Alliaria
- P. 264. l. 17. *For* in turpentine, *read* in oil of turpentine;
- P. 265. l. 1. *For* in, *read* so they do
- l. 2. *For* They have, *read* and have therefore
- l. 21. *For* have the same good consequence, *read* but it was with the good consequence of suppressing the gleet.
- P. 271. l. 14. *For* proper, *read* peculiar
- P. 274. l. 2. *After* often, *add* a part of
- l. 18. *After* other, *add* exotic
- P. 275. l. 12. *For* though sometimes he is, *read* for from these we understand them better, and are less
- P. 276. l. 20. *For* G. Alpinus, *read* L. Apinus.
- P. 277. l. 14. *For* in turpentine, *read* in oil of turpentine.
- P. 278. l. 17. *After* discoverable, *add* only
- P. 284. l. 10. *For* four, *read* three
- l. 26. *After* Absynthium, *add* vulgare
- l. ult. *After* that, *add* not
- P. 288. l. 3. a fine *For* of the paroxysm, *read* of paroxysms,
- P. 293. l. 15. *Here, and in several other places of this paragraph, for* intermission, *read* remission
- P. 294. l. 22. *For* Warhoff, *read* Werlhoff,

- P. 295. l. 26. *For the degree, read the symptoms.*
 l. 31. *For cause of the, read cause and*
- P. 301. l. 3. *After 3i. add at one dose,*
 l. 7. *For of the bark, read for the use of the bark,*
 l. 7. *For but here, as in, read as even in*
 L 12. *Dele the whole line, and read, the paroxysm does not come on, and no sense of cold, paleness of the nails, or languor,*
- P. 315. l. 20. *For as stimulant without the narcotic qualities, read In strong wines both the stimulant and narcotic qualities are in a high degree*
- P. 326. Note l. 6. *For arrive, read arise*
- P. 333. l. 15. *For destroys, &c. to removed, read weakens the powers of sense and voluntary motion, by weakening the energy of the sensorium.*
- P. 343. l. 5. *For affected, read affecting*
- P. 344. l. ult. *For Trallius, here and in other places, read Tralles.*
- P. 345. l. 8. *For that fever, &c. to repetition, read that every continued fever consists of repeated paroxysms.*
 l. 15. *After remedy, add to.*
 l. ult. *For have we, read as we have*
- P. 347. l. 14. *For confined to, read retained in*
- P. 351. l. 22. *After most, add distant*
- P. 353. l. 5. *For which, &c. to suppuratory, read which has been supposed to be the poisoning*
 l. 19. *Dele Regnerus.*
 l. 26. *For Lamberkin, read Lambergen,*
- P. 356. l. 8. *Dele not*
- P. 357. l. 3. *Dele bark*
- P. 360. l. 20. *We are now enabled, by a sight of other manuscripts, to put the whole of this paragraph in a better condition; and give it accordingly as follows:*

With regard to every affection of the nervous power, we have been much in the dark, and particularly, with regard to the nature of spasmodic affections, and antispasmodic remedies. The learned Gaubius thus defines spasm : *Spasmus dicitur violenta, invita, inordinata fibrarum motricium actio.* The original word in the Greek language means no more than contraction; but it is necessary to distinguish those contractions which are performed in health, from those which are morbid, and it is only to the last that the term spasm is now applied. Dr Gaubius, by the terms of his definition, intends to express the circumstances of the morbid state. The actions of muscles are voluntary or involuntary, the first are morbid when *invitae*, and both are so when *violentae et inordinatae*. But, to render the definition still clearer, the term *inordinata* must be understood to comprehend a great deal with respect to both the cause and the manner of contraction : Thus, the contraction of the heart is ordinarily excited by the influx of venous blood, and, in health, is in proportion to the state of that; but, if excited by other causes, it may be said to be an *inordinata contractio*. The term seems to be more properly applied to some irregularity in the manner of contraction; and we shall mention a chief instance of this kind. We think it is a law of the animal oeconomy, that the contraction of moving fibres is naturally succeeded by a relaxation of them; and, commonly, the muscles contracted by the power of the will, or other natural causes, are easily stretched out again by their antagonists, or other powers applied. If, therefore, it happens, that the contraction of a muscle is not spontaneously succeeded by a relaxation, and does not easily yield to antagonist or other

stretching powers applied, such a contraction may be said to be *inordinata*; and it is to this state of contraction, that many of the moderns confine the term spasm, while the other states of inordinate contraction they call convulsions. Thus, Dr Gaubius, ‘ Qui spasmus a convulsione distinguunt, illum vocant continuam, hanc alternantem, musculorum contractionem.’ This excellent author, however, is doubtful if such distinction is necessary; ‘ Perinde fuerit,’ says he, ‘ num eodem an diversis nominibus utere: Uterque enim effectus ad idem genus pertinet, partes easdem occupat, similesque et causas et differentias agnoscit; quin et haud raro alius in alium transit.’ It is certainly just, as the learned author observes, that these affections are nearly related to each other, and truly belong to one genus; but, at the same time, they are evidently different species, and may therefore properly be distinguished by different appellations. However, we must own, that this is hardly the place for it, as we cannot say that the several medicines to be here mentioned under the title of antispasmodic, are more suited to the one than to the other species of affection. We find ourselves obliged to comprehend both cases under the title of spasmodic affections; and, by antispasmodic, we mean such medicines as are suited to take off either, or both affections.

As to their manner of operating, it is difficult to explain. Spasmodic affections may depend upon an extraordinary influx of nervous power, and that, either in consequence of a stimulus applied to the part or to the sensorium, or in consequence of an unequal distribution, depending upon the weakness and mobility of the nervous power. From hence it may be perceived,

why sometimes sedatives and sometimes stimulants prove antispasmodic, and some have thought, that all antispasmodics are either the one or the other; but besides those more obviously sedative or stimulant, there seem to be antispasmodics distinct from both. Stimulants are very generally such to the sanguiferous system, and very often sedatives shew the same effects; but there are antispasmodics which do not at all. Again, there are antispasmodics which discover none of the narcotic qualities of sedatives; and therefore, from both considerations, we presume there are antispasmodics distinct from both the stimulants and sedatives. We shall indeed have occasion frequently to say, that the antispasmodics are intimately connected with these other classes; but still, we do not allow this to be universal, and would rather assert, that most of the medicines in our list of antispasmodics are more such than in proportion to their stimulant or sedative properties.

Page 366. line 21. *For which, &c. to as, read wherefore, as plants of this class are frequent in Europe, and*

P. 369. l. 3. & p. 374. l. 5. a line *For Mangini, read Menghini.*

l. 23. *For it is rejected with an uneasy sensation, at the same time producing heat, read this is affected with an uneasy sensation of heat,*

l. 26. *For the diversity, read this diversity*

l. pen. *For in its, read with respects to its*

P. 370. l. 17. *After recommended, add in epilepsy,*

P. 371. l. 2. a line *And in other places of this paragraph, for Erysypelas, read Eryspelas.*

P. 372. l. 15. *For over, read even.*

P. 375. l. 7. *For lateritiæ, read lateritium;*

P. 385. l. 4. *For stretching, read straitening*

l. 26. *For of that impregnation, read of it in that condition.*

Page 386. line 2. *For with, read from*

P. 387. l. ult. *We would wish to say here, that this censure of Dr Haller's works must be understood to be strictly confined to those parts of it only which relate to the chemical doctrine of the fluids; for we know that in other respects our author has a high esteem of the judgment and erudition of Dr Haller.*

P. 390. l. 12. *For even admit not of diffusion, read readily admit of diffusion;*

l. 14. *For decomposition, read resolution of their mixture.*

P. 391. l. 6. *For the admixture of the whole, read their being laid on one another;*

P. 393. l. 18. *Before There, add Besides these*

l. 19. *For blood, read body,*

l. 20. *After and, add may again be*

l. pen. *For in, read from*

P. 394. l. 3. a fine *For formerly, read formally*

l. ult. *For changed, read formed*

P. 395. l. 5. & 6. *For perfectly extract, read fairly resolve*

l. 7. & 10. *For decomposition, read resolution.*

l. 11. *After it, add in its original form.*

P. 469. l. 5. *For did not beware, read was not aware*

l. 10. *For flowing ropy from the vein, read of blood's concreting, and forming a rope as it flowed from the vein,*

l. 12. *For vessel, read limb*

P. 397. l. 19. *For body, bottom, read a solid body immersed, the bottom,*

P. 399. l. 26. *For are far from being of a perfect disposition, read seem not to be of a perfect fluidity,*

P. 400. l. 4. *For to each other, read of each.*

l. 7. *For arising; 1. read and*

Page 400. line 23. *After* ~~lento~~, *add* and if at any time the secretions be diminished, the saline parts must be increased, must become more and more putrid, and thereby occasion a greater fluidity of the whole.

l. 27. *Dele* the same effect, &c. *to* density, l. penult.

P. 401. l. 5. *For* This may, &c. *to* back, l. 6. *read* This may be diminished either by too great evacuation or by the ordinary evacuation not being supplied by drink.

P. 401. l. 10. *For* more faeces are produced; *read* less nourishment is extracted;

l. 15. *For* it, *read* is

l. 18. *Dele* except, &c. *to* solids, l. 19.

l. 25. *For* there is, &c. *to* secretion, *read* there is no exhalation or dissipation of fluid parts but what is made by secretion.

l. 26. *After* than, *add* that

l. 27. *After* rest, *add* is produced ;

P. 402. l. 21. *Dele* or the moving power

P. 404. l. 29. *Dele* and it is, &c. *to* restored, l. 31.

P. 405. l. 19. *For* cause, *read* subject

P. 406. l. 23. *For* diffused over the system, *read* is diffused over the system; and.

P. 407. l. 21. *For* whence, *read* when

l. 22. *For* curdles it, *read* separates the oil,

l. 27. *For* Now when this is gone, I find, *read* Now though this disease is gone, I still find.

P. 411. l. 5. *For* xii. *read* a large quantity.

P. 412. l. 24. *After* one, *add* part

P. 414. l. 24. *After* membrane, *add* or into the cavities,

P. 415. l. 6. *Before* A faulty, *add* The fluidity of the blood may also be varied by the proportion and state of the more dense and concreting parts of it, and the fluidity may be increased either by a defect of these parts, or by a diminution of their force of cohesion,

Page 415. line 6. *For solid parts, read of the more consistent parts of the blood,*

l. 16. *After but, add in*

l. 26. *Dele Whatever, &c. to putrefaction, l. 30. and add, This may happen from the fluids proceeding too far towards, putrefaction, or from other causes, of an over proportion of saline matter in the blood.*

P. 416. l. 9. *For second, read first*

l. 10. *For viscosity of the fluids, read viscid fluids,*

l. ult. *After demulcents, add which*

P. 417. l. 4. *For putrid, read acrid*

P. 419. l. 16. *For SIMPLE GUMS, read MUCILAGINOSA.*

l. 20. *For ℥ii read ℥iv*

P. 420. l. 7. *For the foundation of, read to have its virtues depending on*

l. pen. *For foreign, read different*

P. 422. l. 19. *For I doubt, &c. to subclavian, l. 19. read I doubt if even the chyle ever appears there, as some alledge, considering the diffusion it must undergo immediately after passing from the thoracic duct into the subclavian vein.*

P. 428. l. 1. *After aloes, add a pint, and after ointments, add it has been*

P. 429. l. 18. *For and besides, &c. to dose, read and when the alkali of the soluble tartar is taken away, the cream of tartar does not remain in a sufficient*

P. 431. l. 9. *For that art has, read that medicines have*

P. 432. l. 3. *Dele only*

l. 5. *For acid, read metal.*

l. pen. *For rather have, read shew*

l. pen. *For viz. &c. to aphthae, read and their operation is probably by stimulating the excretories, and drawing forth a fluid, by which crusts and sloughs are pushed of.*

P. 432. l. ult. *For cough, read catarrhal affection,*

P. 433. l. 1. *For mouth, read mouth of the glands or throat,*

Page 433. line 22. *After disorder, add unripe fruit are much less disposed to ferment than the ripe;*

P. 434. l. 6. *For acescents, read acids, and for acids, read acescents*

l. 8. *After some, add bad*

l. 14. *For systems, read parts of the system.*

P. 435. l. 3. *For exerting, read exerted*

P. 437. l. 8. col. 1. *Dele elix. vitr. dulce*

l. 8. col. 2. *Dele nitrum coraliatum*

l. 22. *After included, add here*

l. pen. *After but, add their defects are supplied, and*

P. 438. l. 5. *The diffidence expressed in this paragraph, however proper in general, happened to be ill placed here. We are well persuaded, that Dr Cullen is now satisfied that the experiments of Sir John Pringle are sufficiently confirmed, and appear to have been planned with sagacity, executed with exactness, and communicated with the greatest fidelity. In short, every one is now agreed, that this excellent philosopher and physician has made very useful and important discoveries on this subject.*

l. pen. *For method, read operation*

P. 439. l. 12. *After evacuants, add diffused*

P. 440. l. 2. *After applied, add near*

l. 12. *For in the head, read about the head,*

P. 443. l. 1. *For increasing, read breaking*

P. 450. l. 1. *For one twentieth part of a grain, read a very small quantity*

P. 452. l. 12. *For Draffiae, read drageae*

P. 453. l. 6. *Dele small, and after calomel, add alone*

l. 15. *After is, add again*

P. 454. l. 1. *For diffuse, read difficult*

l. 8. *After mercury, add as the corrosive sublimate*

l. 20. *For means, read causes*

P. 457. l. 8. *For hydropic, read hydragogue*

- Page 458. line 13. *For of ʒii or ʒiii, read of from ʒii to ʒviii*
- P. 463. l. 3. *For prevents, read occasions*
 l. 4. *After blood, add which usually happens*
- P. 465. l. 7. *For Practitioners have spoke of giving, read The same Dr
 Robinson gave*
- P. 467. l. 15. *Dele and sulphur,*
- P. 468. l. 6. *After mercury, add combined with*
- P. 469. l. 26. *For crocus, read regulus*
 l. pen. *For Corrichuis, read Cornachini,*
 l. pen. & ult. *For emetic nitre, read emeticum mite*
- P. 475. l. 1. *After purge, add the whole body*
 l. 13. *For where in consequence of the, read whereby they
 make a*
 l. 14. *After head, read and*
 l. 15. *After evacuation, add made from the extremities of the
 descending aorta,*
 l. 25. *After cathartics, add but it may be proper also to point out
 more particularly some of their bad effects,*
- P. 477. l. 16. *For ʒiii, read ʒii*
 l. 19. *For irritability, read some of its purgative quality*
 l. 19. *For from, read by*
 l. 20. *For without, read free from*
 l. 30. *Before haemorrhoidal, add and*
- P. 484. l. 2. *For best, read most frequently employed*
 l. 25. *For diffused in water, read very well divided,*
- P. 485. l. 12. & 13. *For The Pharmacop. Edinensis, read They*
 l. 28. *For and this, read This for dissolving silver*
- P. 486. l. 21. *After these, add in increasing urine,*
 l. 22. & 23. *Dele Dr Ward's powder is the only certain diuretic*
 l. 23. *For This, read The failure of the diuretics*
 l. 25. *Dele and also, add, We may be disappointed in many sup-
 posed diuretics.*

- Page 486. line 29. *For* astringentibus curando, *read* per astringentia pellendo,
- P. 487 l. 18. *After* absorption, *add* they draw out
- P. 488. l. 8. *For* case, *read* practice
- P. 489. l. 11. *For* mitigated with acids, *read* properly diluted,
- l. 29. *For* without; *read* with our
- P. 490. l. 9. *For* found, *read* founded
- P. 491. l. 2. *For* an intermission, *read* a new accession,
- l. 30. *After* motion, *add* has been blamed
- l. pen. *For* whether is, *read* whether it is
- P. 492. l. 22. *After* explained, *add* by supposing an affinity between the
medicine and the fluid to be secreted,
- l. 23. *For* none such, *read* no specific stimuli of the uterus
- P. 493. l. 5. *For* derivation, *read* determination,
- l. 25. *For* established, *read* near at hand,